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NOVEMBER 1959

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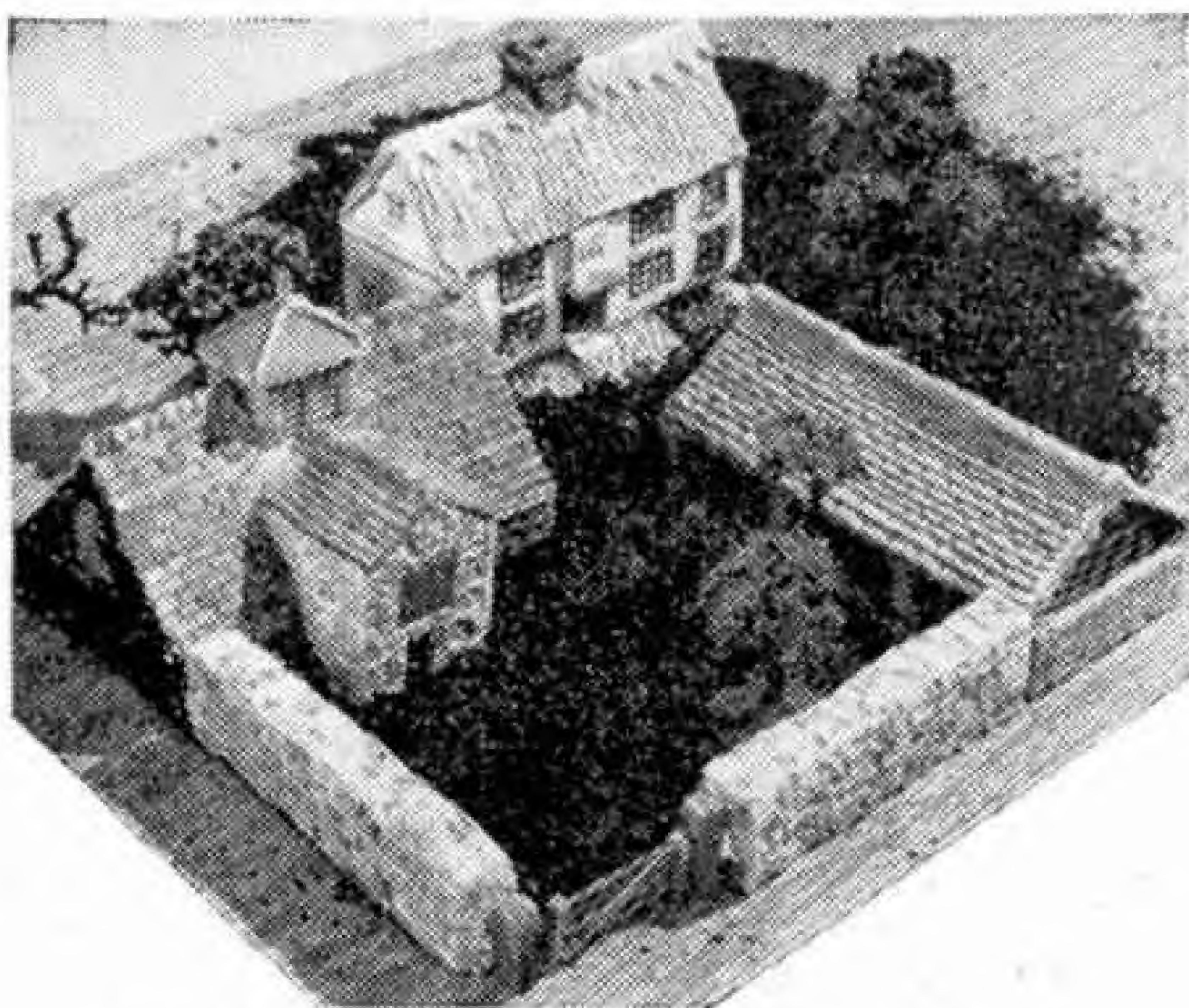
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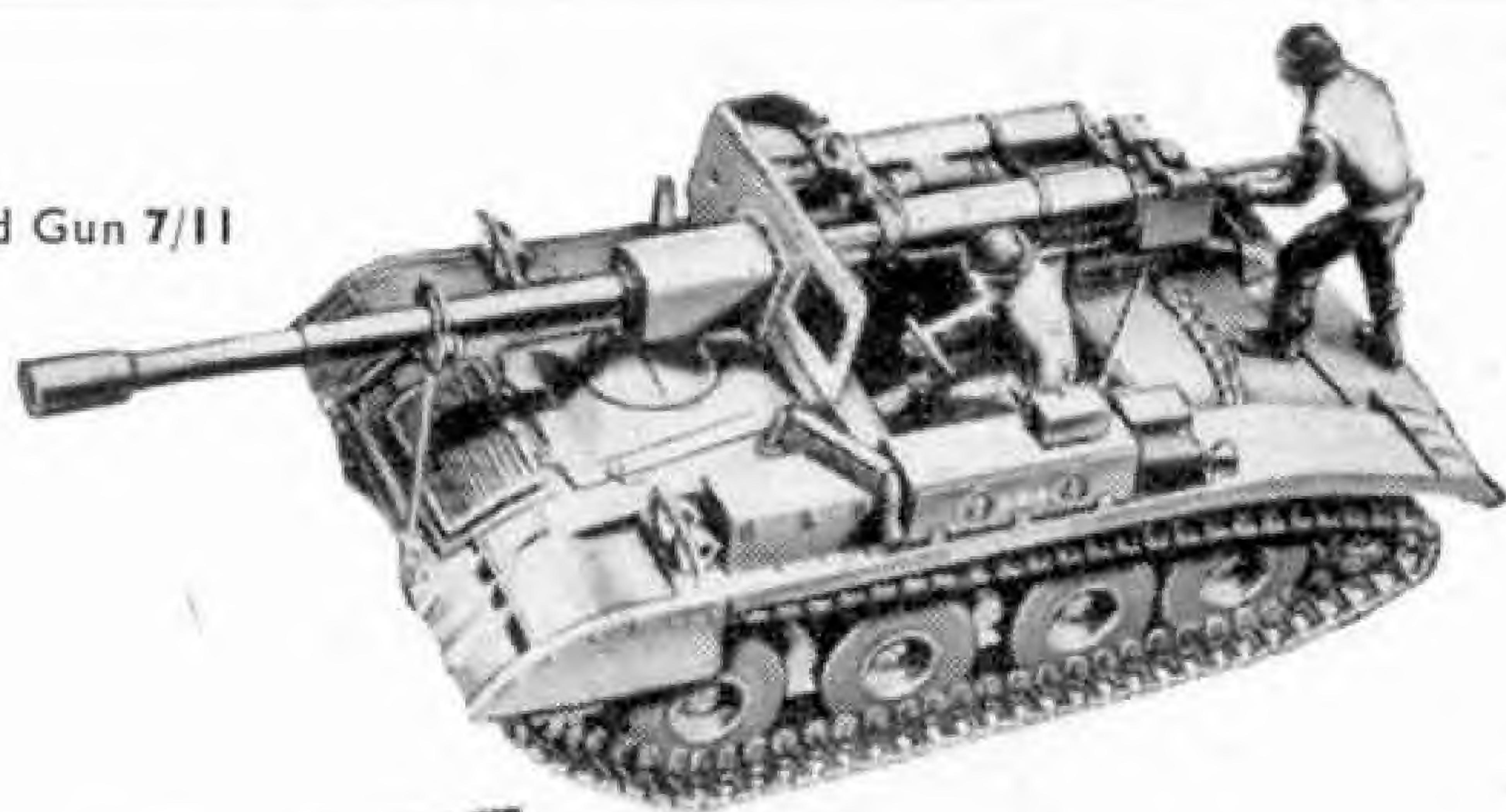
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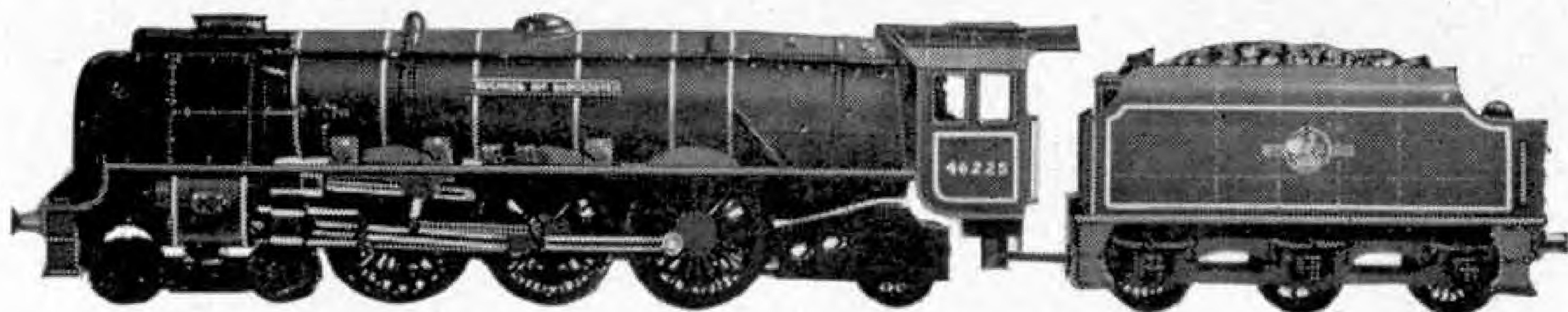
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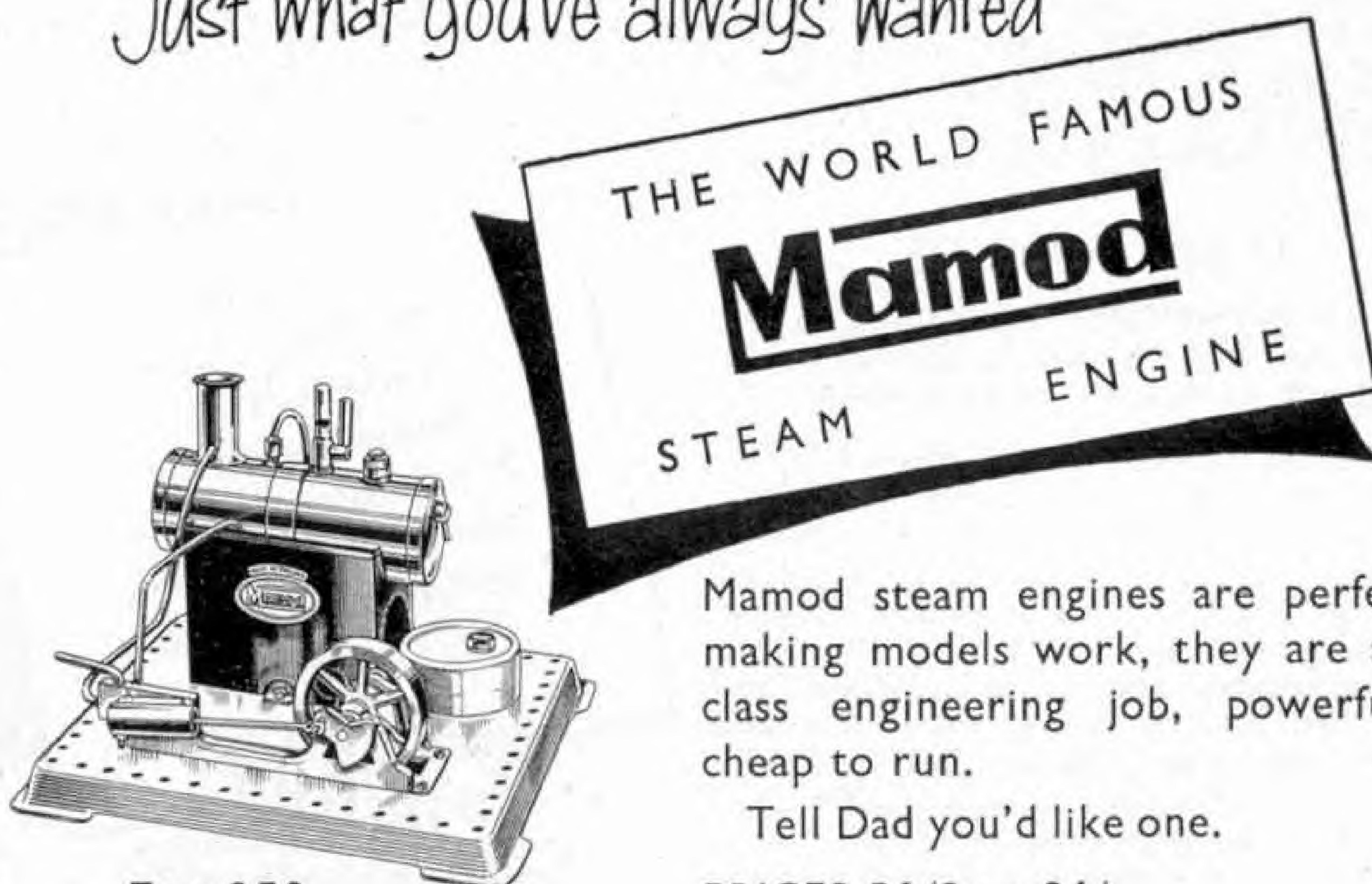
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
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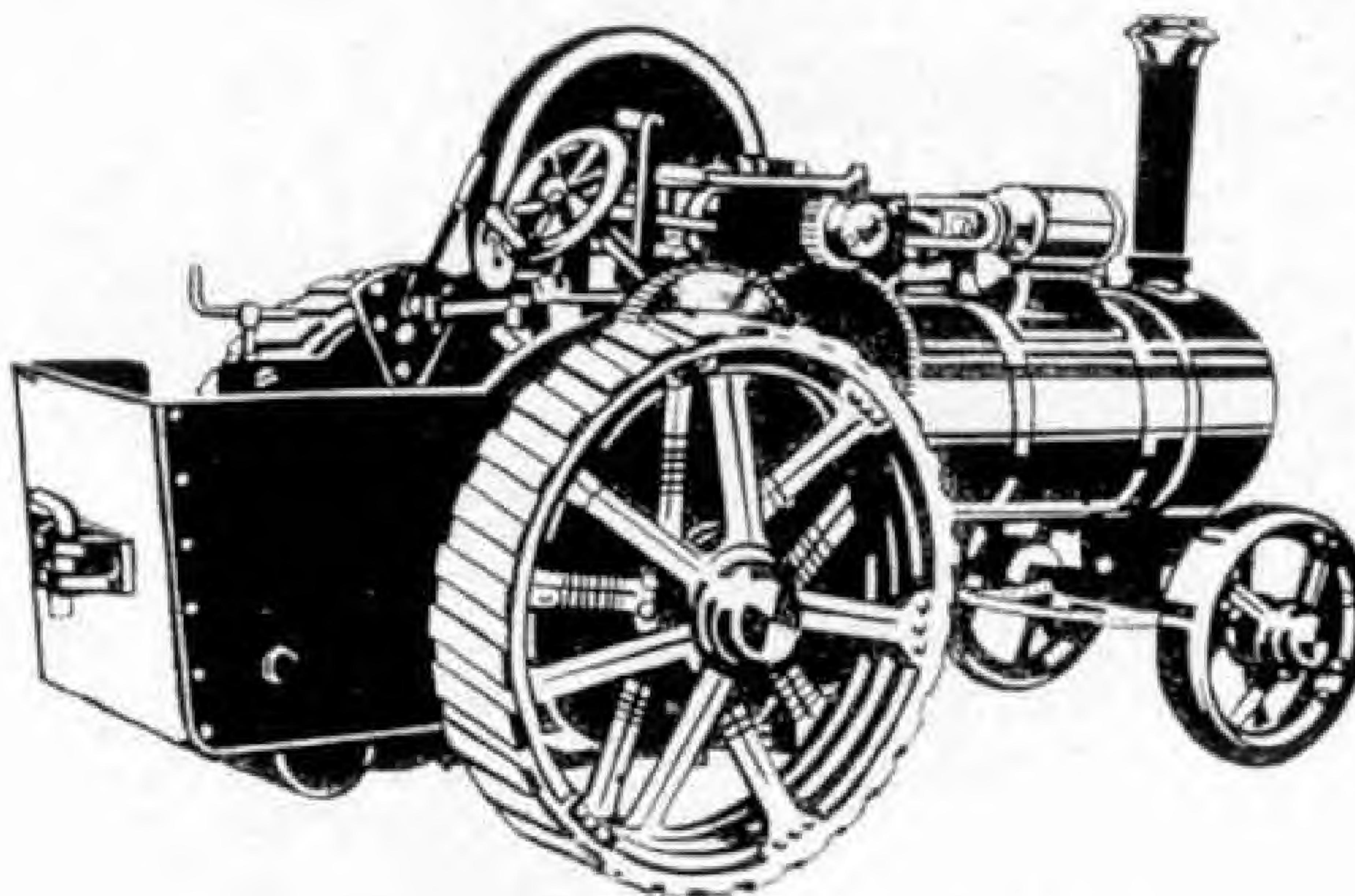
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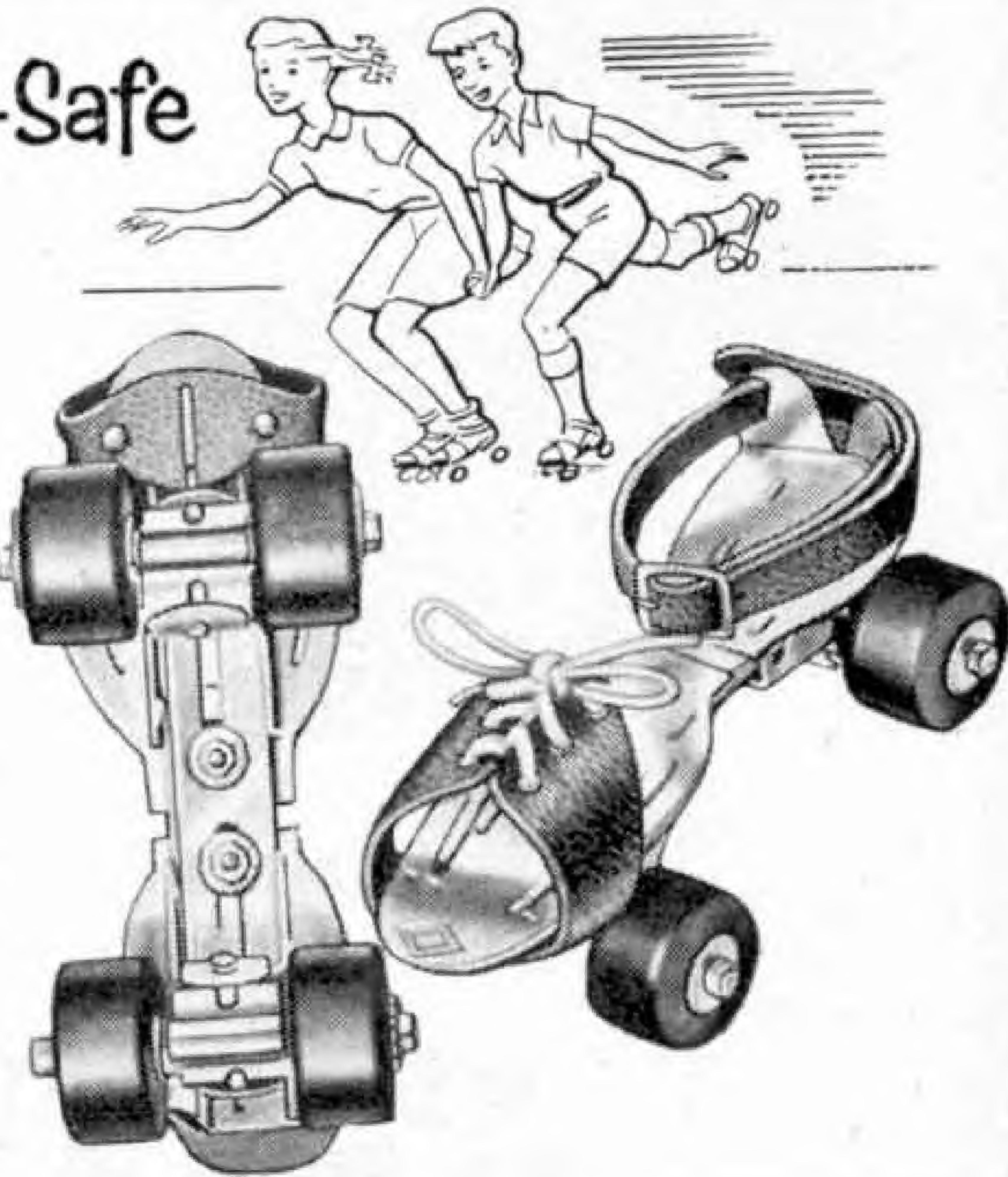
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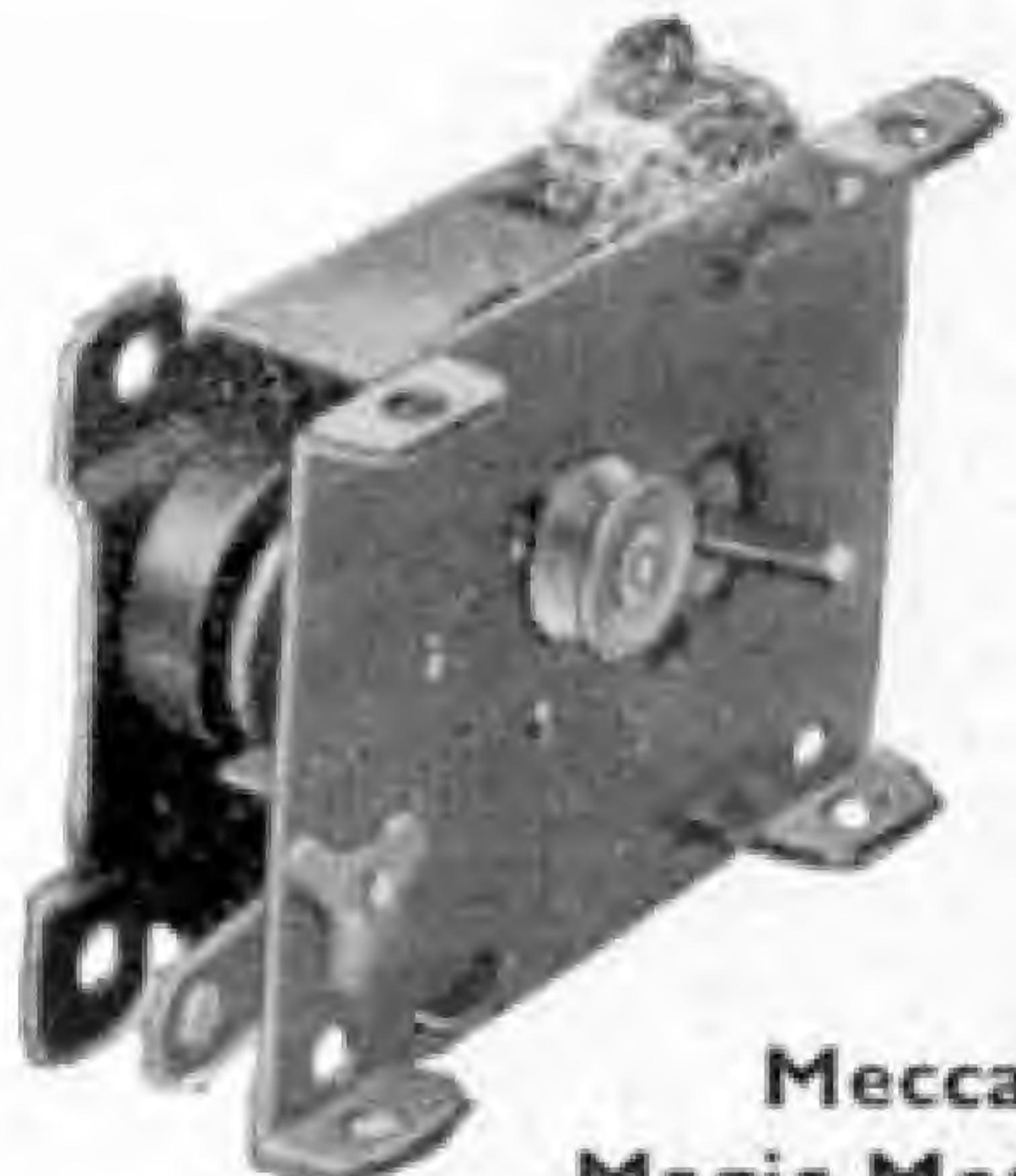
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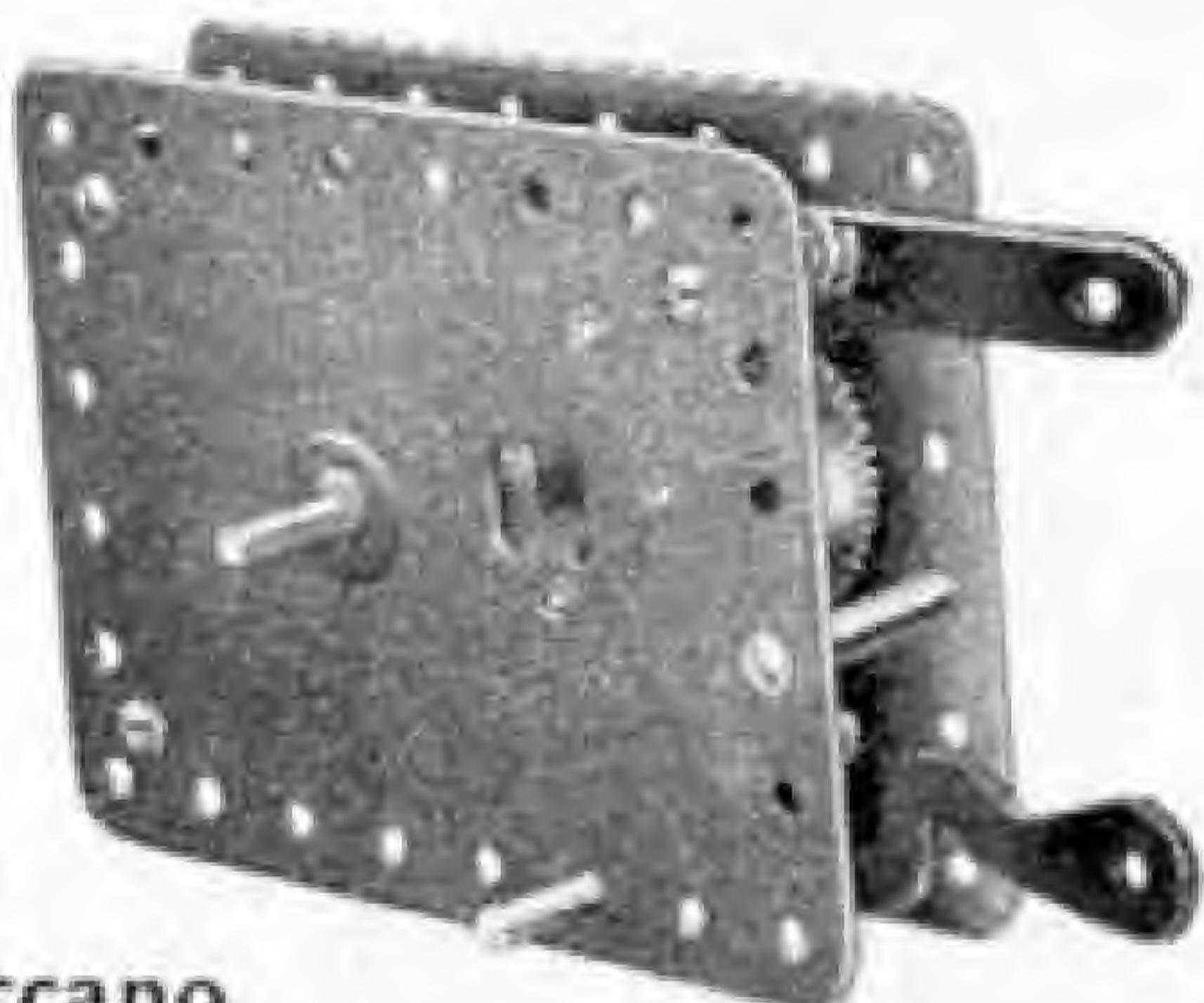
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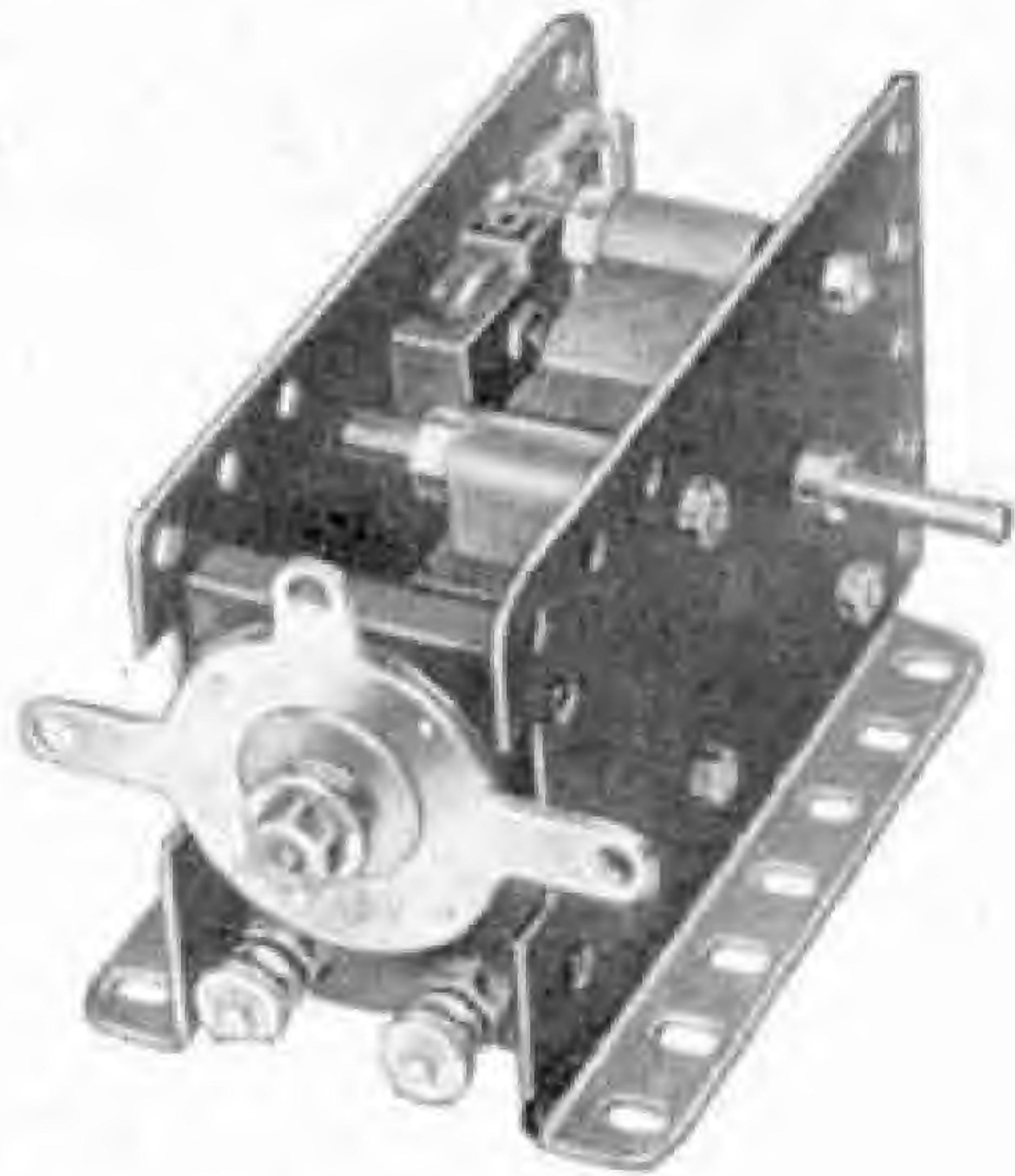
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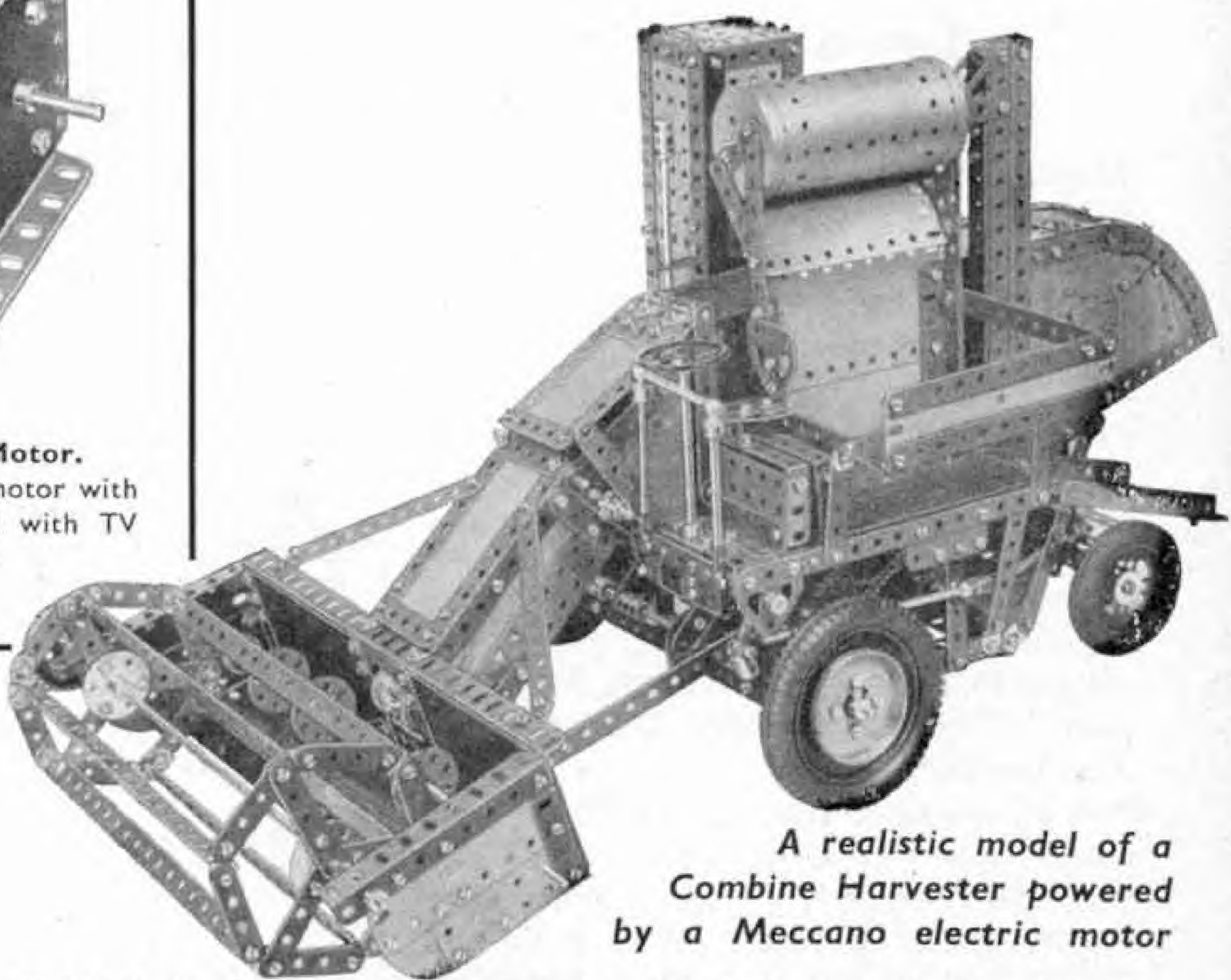
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MECCANO MAGAZINE

Editorial Office:
Binns Road
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England

EDITOR : FRANK RILEY, B.Sc

Vol. XLIV
No. 11
November 1959

Our Christmas Number

HERE I am, thinking of Christmas, and the weather is still very warm and dry—almost describable as hot, in fact—with the Sun beating down on parched ground everywhere. As far as I can make

a host of other contributions of the kind that the *M.M.* over the years has made its own.

So you will be in for a good time when the December issue appears. Although it will be larger, there will be no increase in price. But do make sure of your copy by ordering it from your dealer or newsagent.

But while I am looking ahead for Christmas, I am still thinking of this year's weather, and particularly of the water position in Great Britain. I hope that the experience of 1959 will give us a new appreciation of water. We are so used to having it literally on tap that we do not often give it as much thought as we should. But it is a prime essential of life, and we should have to think very seriously



The flexible vehicle seen above climbing over a low stone wall can be bent V-shaped as well when crossing ditches. More about this can be read in an article on page 482 of this issue.

out, the last summer as brilliantly dry and sunny as this one was that of 1750, 209 years ago, and that too must have stretched beyond the normal limits of summer time, well into autumn.

And, of course, I am thinking of Christmas for the simple reason that it is not now far away. In the Editorial Office of the *M.M.*, we reach it some time before readers generally, for we have to allow time for preparing and printing the December issue. This will be a good one, with a really "Christmassy" cover, topical articles and

about it if we had to dig it out of the ground, as we have to do with coal, or to erect vast works to produce it, as in the case of gas and electricity. Normally it is just showered on us, a free gift from the skies, and all we have to do is to spend the money necessary to store it to better effect, and to share it out more equally, for some parts of the country are not well equipped to face summers like that of 1959.

The Editor

New Tracks and Tunnels

Improvements on the Eastern Region Main Line

THE Great Northern Line of British Railways is a very busy one. Over the track of this direct descendant of the former Great Northern Railway passes a succession of famous named trains as well as other passenger trains and goods trains, between King's Cross, its London terminus, and destinations in Scotland, and the north of England and other points nearer to the capital, such as Cambridge and the more residential and suburban area immediately north of the capital.

Because of its traffic, the G.N. main line consisted for a long time of not less than four tracks between King's Cross and Holme, south of Peterborough, except for two stretches of double track only. One of these was across Welwyn viaduct and the other from Greenwood signalbox, near New Barnet, to just north of Potters Bar. But now only the Welwyn viaduct section of double track remains, as four tracks have been laid down and are now in use between Greenwood and Potters Bar.

It is of interest that the conversion of this to a four-road section completes a scheme that was actually contemplated by the former Great Northern Railway many years ago, in 1882. It was not put in hand throughout, because many of the London suburban trains terminated at New Barnet, to which station the multi-track section from King's Cross ultimately extended. Then in 1895 came an alternative proposal for a loop line from Enfield to Stevenage, via Hertford, which would afford relief to the main line and at the same time had the advantage of opening up new territory. This loop was opened to Cuffley

in 1910, and brought into use for freight trains beyond that in 1918. It has afforded much-needed relief to the main line and has proved useful in various emergencies and other occasions. Without it, indeed, the crowding of trains on the main route would have become intolerable many years ago.

From Cuffley to Stevenage the Hertford Loop, or New Line in G.N.R. terms, was single line until 1924, and the bulk of the heavy and fast long-distance traffic has been funnelled through the original two-



The view from the platforms at Hadley Wood towards the North tunnels. The illustrations on this and the following page, and much of the information in this article, are reproduced by courtesy of the Eastern Region, British Railways.

track main line section between Greenwood box and Potters Bar, the station at which hard-working engines breast the summit of the long climb out of the terminus over the Northern Heights. Matters were helped by the introduction in 1932 of semi-automatic colour light signalling, and track circuiting over this length. But to improve services and operating conditions the widening of this section was really necessary.

The first stage of improvement began in 1955, and included the building of a new station at Potters Bar that was described in these pages in March 1956. The rest of the work has now been completed, four years after starting. This may seem a long time to finish $2\frac{1}{2}$ miles of railway, but the job has included the boring of three new

double line tunnels alongside the existing ones, as well as the necessary earthworks, such as the widening of cuttings, track laying, station alterations and the installation of new colour light signalling

require no additional fastening between rings, other than the ribs and recesses on adjacent faces. And in the clay formation no cement filling, or grouting as it is called, is needed between the tunnel lining and the surrounding earth. Special concrete segments designed to maintain the interlocking system were cast for the tunnel rings required to accommodate the refuges placed at intervals in the tunnel walls, and for those where the two ventilating shafts in the Potters Bar tunnel meet the actual bore.

One of our illustrations shows a typical section of completed tunnel, with the track laid all ready for the trains. To ensure that there would be



Inside one of the new tunnels, with the track completed. The tunnel lining, built of pre-cast concrete segments, is clearly shown, as also are the refuges for surfacemen and the hooks for supporting the signalling cables.

and track circuiting.

The construction of the Hertford Loop included two tunnels, that at Ponsbourne, 2,684 yds., being the longest on the Great Northern system. It was also the last railway tunnel of any importance in this country to be driven through clay until the tunnelling operations on the widened section we are now dealing with. Since it was constructed conditions have changed a great deal, so that the methods then in use could not be adopted in building the new tunnels. For instance, men used to laying new tunnel brickwork, as in Ponsbourne tunnel, where there are seven rings of it, are not easy to find nowadays, and in any case suitable bricks are scarce and expensive.

So concrete instead of brick lining has been adopted, using, for the first time, rings built up of pre-cast interlocking segments or blocks of this material, which

no adverse effect on the concrete lining from the passage through the tunnels of steam locomotives, a special kind of cement was used for the pre-cast concrete units or "voussoirs" used above the level of the ballast. These and other units for the invert, which is the section below the ballast, were produced in a concrete factory set up for the purpose near the widening works.



The new and the old South end portals of Hadley Wood North tunnel.

Incidentally, a narrow-gauge light railway, with 28 diesel locomotives to provide the motive power, was built to carry the blocks to the tunnel sites. This was quite a system, with sidings, loading points, a maintenance depot and marshalling yard.

The actual tunnelling was carried out by means of shields. A shield is a metal ring

the tunnelling shields. Then there were arrangements for shifting the "spoil" or earth removed by the tunnel miners. This was transferred by conveyor belt to a hopper from which it was loaded into small tipping wagons running on the temporary narrow gauge track.

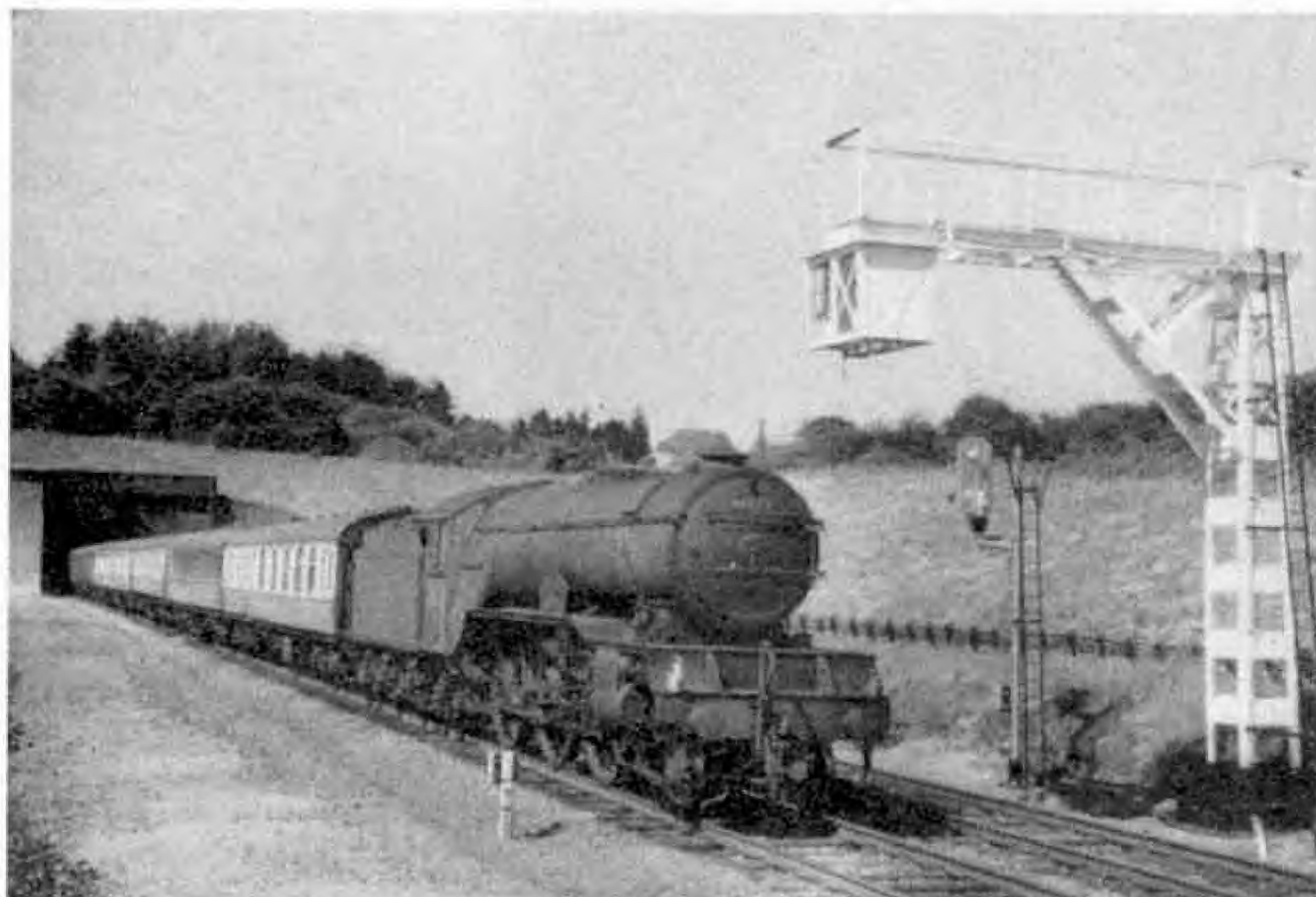
Cuttings had to be widened, on the down side of the line, to allow for laying the additional tracks. For this work draglines and bulldozers were used, the cutting slopes being trimmed generally to a slope of 1 in 7. As is sometimes the case nowadays, disposal of the material excavated from the cuttings and tunnels—three-quarters of a million tons of it—provided something of a problem. Fortunately it became possible to use a site on farming land, to which it was conveyed by the narrow gauge railway. Here the earth was deposited to agreed contours, covered with top soil and sown with grass.

Drainage has had special attention in the

new work. At intervals in the cutting slopes there are counterforts, or drainage channels up to 10 ft. deep, filled with graded material. The cutting banks are sloped upward along the route to a point midway between each pair of these channels, so that moisture tends to move downward toward them.

It has been noted that the first stage included the building of a new station at Potters Bar, and further progress has included the reconstruction of the station at Hadley Wood.

Track laying came last. This had to be arranged very carefully because access to the tunnels was necessary, and various temporary connections had to be provided at each end of the widening work so that traffic could continue with the least possible interference. In addition, as the widening was carried out on the down side of the line, and the new tunnels were built there, re-arrangement of existing tracks resulted in the original down and up lines in the old tunnels becoming up fast and up slow respectively. The new tunnels carry the down slow and down fast tracks.



An up express emerging from Hadley Wood North tunnel and approaching the station. The engine is V2 2-6-0 No. 80772, "The King's Own Yorkshire Light Infantry". Photograph by G. J. Jefferson.

standing upright and divided crosswise into a number of compartments, or galleries, at different levels. These accommodate the tunnel-face workers, as the shield is pushed forward by means of rams into the earth through which the tunnel is to be driven. The spoil is excavated after each move forward, in this instance using pneumatic shovels, and the tunnel lining, consisting of the units already referred to, was built up behind the shield as this moved on.

The tunnel faces were built with oversize entrances at first, to allow the shields to enter, and the rams propelling the shields were made to bear against temporary rings of lining and trestled piles outside the tunnel at this stage.

Mechanisation was in fact a feature of the widening job as a whole. The site production of the concrete lining components of the tunnels and the transport of these by narrow gauge railway have already been mentioned. The raising and setting of the upper lining blocks into position was carried out by hydraulically operated erector arms fitted to the rear of

Man in Space

By John W. R. Taylor

SOME time in 1961, if all goes according to plan, an American airman will be shot into space by a giant rocket, will encircle the Earth two or three times in a satellite at about 17,500 m.p.h., and will then re-enter the atmosphere for a safe parachute landing.

We already know his name, for the National Aeronautics and Space Administration (NASA) who are in charge of the programme, known as Project Mercury, have chosen seven military test pilots for training as potential space-men. They are Captains Leroy Cooper, Virgil Grissom and Donald Slayton of the U.S.A.F.; Lt. Cdr. Alan Shepard and Walter Schirra and Lt. Malcolm Carpenter of the U.S. Navy; and Lt.-Col. John Glenn of the U.S. Marine

standard of education is necessary when the whole flight will be controlled automatically, with the pilot simply doing a few of the jobs normally done by cameras and instruments. The answer is that if anything goes wrong at any stage, unless the pilot knows exactly what to do, how to do it and why it must be done in a precisely-correct way, he and his craft could easily end up in a fiery streak of molten metal, like a *Sputnik* or shooting star.

So, day after day, week after week, for the next year or two, the seven space-men will study rocket launching techniques, get used to handling controls while encased in a pressure suit, subject themselves to rapid accelerations and decelerations in cabins at the end of whirling-arm centrifuges, and

learn to live for long periods on special liquid food that has to be sprayed into their mouths from plastic bottles to overcome the problem of weightlessness in space.

This will be only the start, for they must become familiar with every detail of their satellite and learn how they can be of the greatest usefulness by bringing back information about conditions in space. They will even be fired down the 5,000-mile Atlantic rocket range in cabins carried by big Redstone war-rockets, to experience the strange effects of weightlessness for periods of up to five minutes.

While they are doing all this, teams of scientists, engineers and designers will be equally hard at work ensuring that the satellite itself will be as safe and efficient as human ingenuity and skill can make it.

Much will depend on the reliability of the rocket used to put the manned satellite into orbit. At the moment the only type powerful enough for the job is the huge Convair Atlas intercontinental ballistic missile, designed to carry an H-bomb warhead for over 6,000 miles; so this will be used for the final launchings. Meanwhile



The seven Mercury astronauts with (extreme right) Mr. R. R. Gilruth, Director, NASA Project Mercury, at Space Task Group headquarters, Langley Air Force Base, Virginia, U.S.A.

Corps. Their ages range from 32 to 38, and all are married, with children.

The one who will make the first attempt will not be selected until the last moment. Meanwhile, all are equally experienced and physically fit, all hold a degree or equivalent in engineering or science, and all are undergoing the same training.

Many people have asked why such a high

replicas of the satellite are being fired on ordinary ballistic trajectories by research rockets known as Little Joe, to show there is nothing wrong with their basic design.

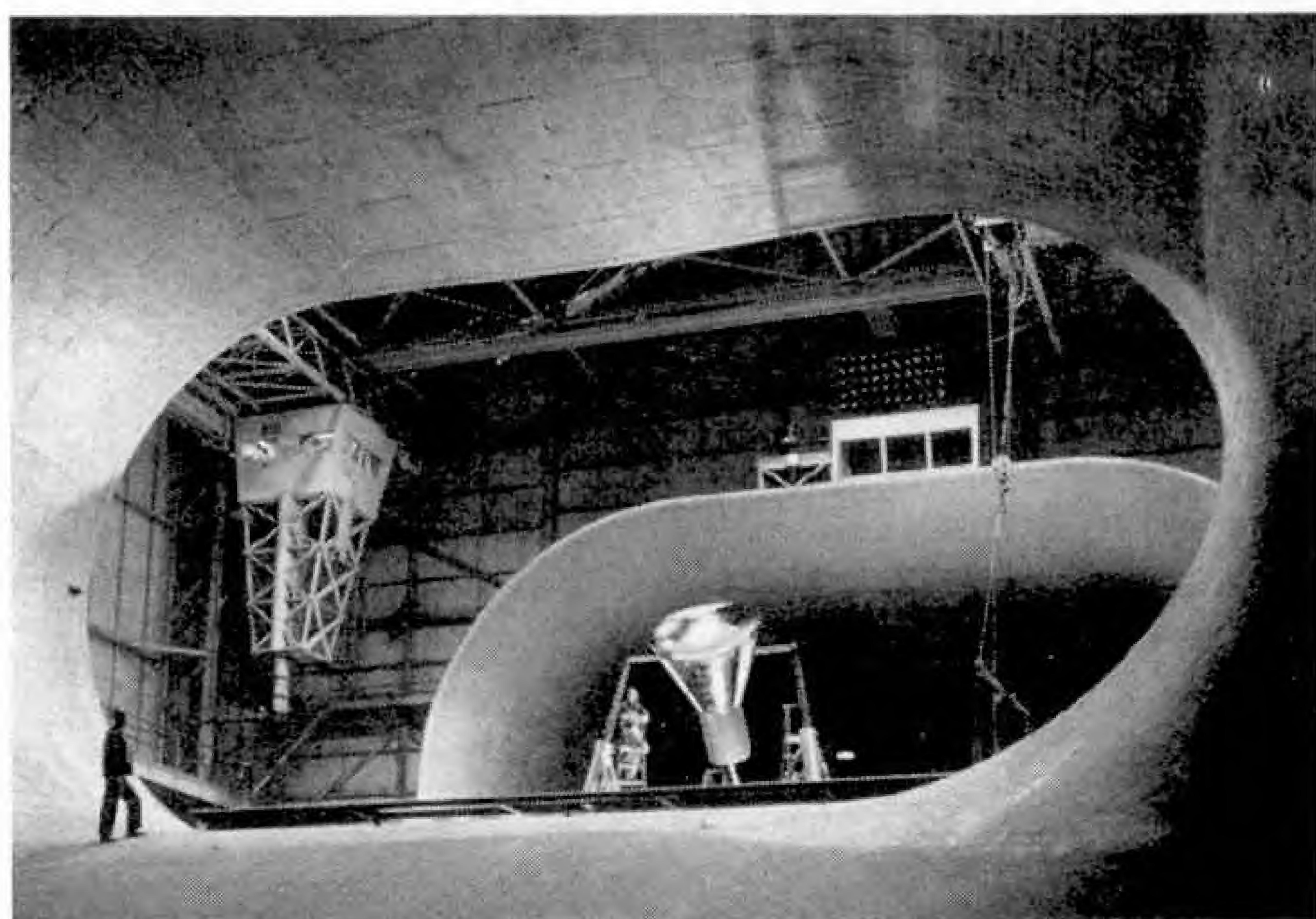
Scale models of the satellite have been tested for many hours in wind-tunnels, at speeds up to nearly 12,000 m.p.h. (18 times the speed

of sound), to prove they will be strong enough to withstand both the huge forces imposed on them during launching, and the "heat barrier" problems encountered as they re-enter the atmosphere.

Meanwhile the McDonnell Aircraft Corporation, who won the Project Mercury design contract against competition from 11 other companies, are building 12 full-size satellites or, to give them their proper name, man-carrying capsules. Some of these will be used for tests, and it has been announced that monkeys will be carried as passengers on Redstone flights and orbital flights before the seven pilots are allowed to risk their lives on similar journeys. But one of those twelve capsules will be the actual vehicle used for the first American attempt to put a man into orbit.

Their design almost certainly is different from what you would expect. The capsule itself is shaped like an old-fashioned circular television tube. The curved face, about 6 ft. in diameter, will be downward when the capsule is mounted on the nose of the Atlas for launching; it will be at the front during orbital flight and re-entry, and must therefore be made of special heat-resisting materials.

The pilot will lay with his back against the curved face on a couch contoured to his individual shape, for maximum support during the initial acceleration. His hands will rest on control buttons and he will have



In the illustration above a full-size replica of the Project Mercury capsule is shown undergoing aerodynamic testing in the full-scale wind tunnel at NASA's Langley Research Center.

a system of periscopes to give him a view outside.

Built on to the outer surface of the curved face will be the retro-rockets (forward-firing rockets) to slow down the capsule when the time comes to leave the orbit and re-enter the atmosphere. At the opposite end of the capsule, in the short "stem", will be the recovery parachutes.

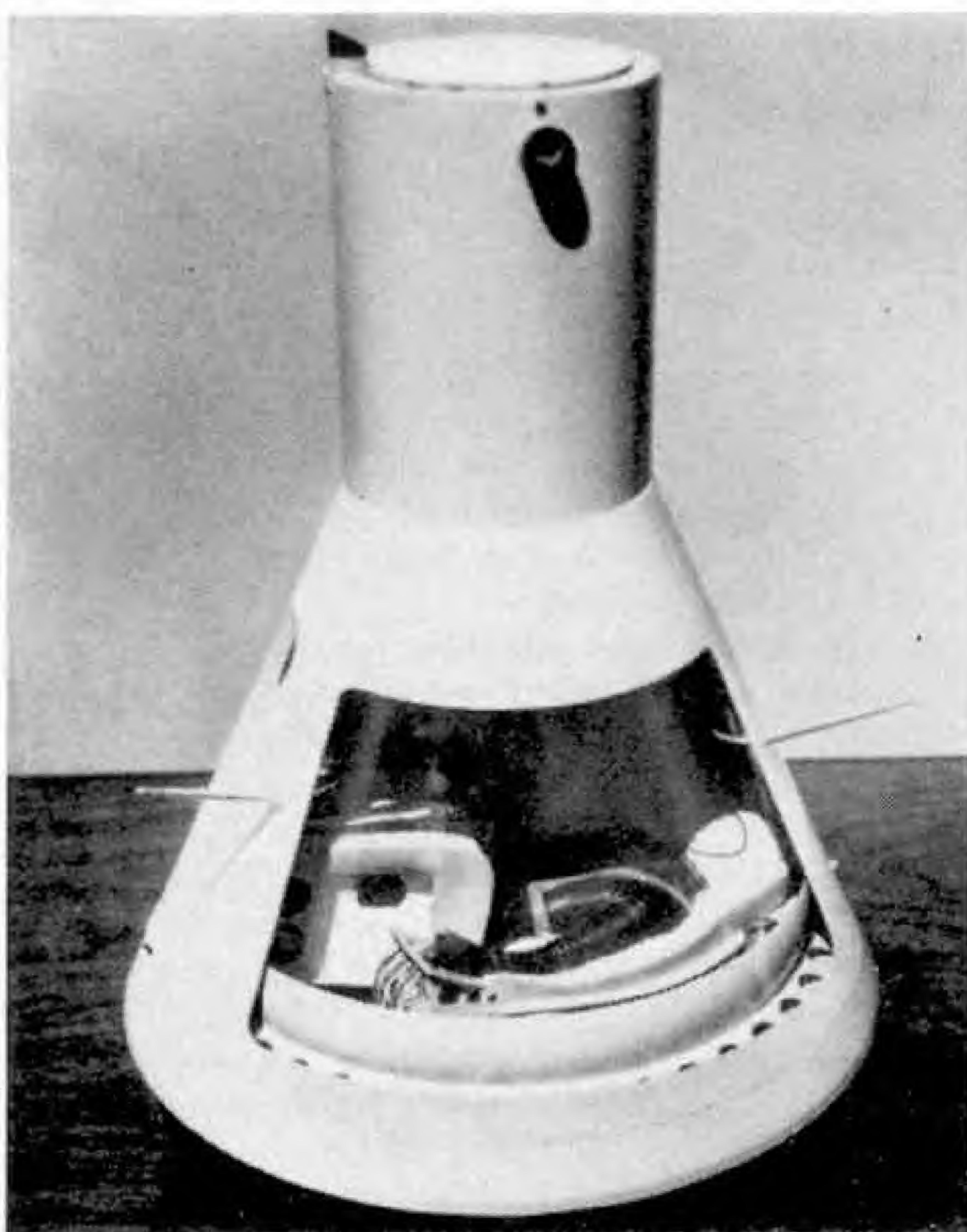
Finally, there will be a jettisonable escape system mounted on the end of the stem and therefore at the top when the rocket is on the launching stand. This will

consist of a girder-like structure with a three-chamber rocket motor on the end.

If anything goes wrong during launching, the pilot or ground controller has only to push a button and the escape system will carry the entire capsule away from the Atlas rocket. When it is well clear, the escape system will be jettisoned and the capsule will be lowered to the ground by its normal recovery parachute.

After all the work and care that is being put into Project Mercury, nothing should go wrong, and it is not difficult to imagine the atmosphere of excitement and tension at Cape Canaveral when the big day comes to launch the first of those seven airmen.

From inside his capsule, the pilot will be able to talk to the men in the concrete blockhouse during the long "count-down", as every single item of the rocket and its tremendously powerful engines is checked.



Model of one of the satellites, or man-carrying capsules, with a dummy indicating the position the pilot will adopt during the space flight. The drawing below illustrates more clearly his position and how the impact of landing back on Earth will be countered.

After what will surely seem the longest hour of his life, he will hear the last few seconds being counted off:

"T minus 10 seconds, nine, eight, seven, six, five, four, three, two, one . . . ZERO!"

He will feel a rumbling vibration from far below as the three mighty engines begin blasting fire and smoke, gradually building up hundreds of thousands of pounds of thrust to raise the 120-ton rocket away from the ramp. At first it will hardly seem that he is moving, but soon the speed of the Atlas will increase rapidly and he will be thrust deep into his couch, as if a huge invisible hand were trying to crush him.

After a time the two booster engines, on each side of the rocket's main engine, will burn up all their fuel and fall away. At the same time the escape mechanism will be jettisoned. Powered only by its main engine, the rocket will continue up on an inclined path, carrying it high over the Atlantic, towards Africa.

Some ten minutes after take-off, the main

engine too will stop, and from that moment the space-man will be in a quiet, almost airless world. Inside his capsule, as it breaks clear of the now-empty shell of the rocket and coasts on at 17,500 m.p.h., about 130 miles above the Earth, he will be in reasonable air-conditioned comfort, and will be able to talk by radio with his friends far away on the ground.

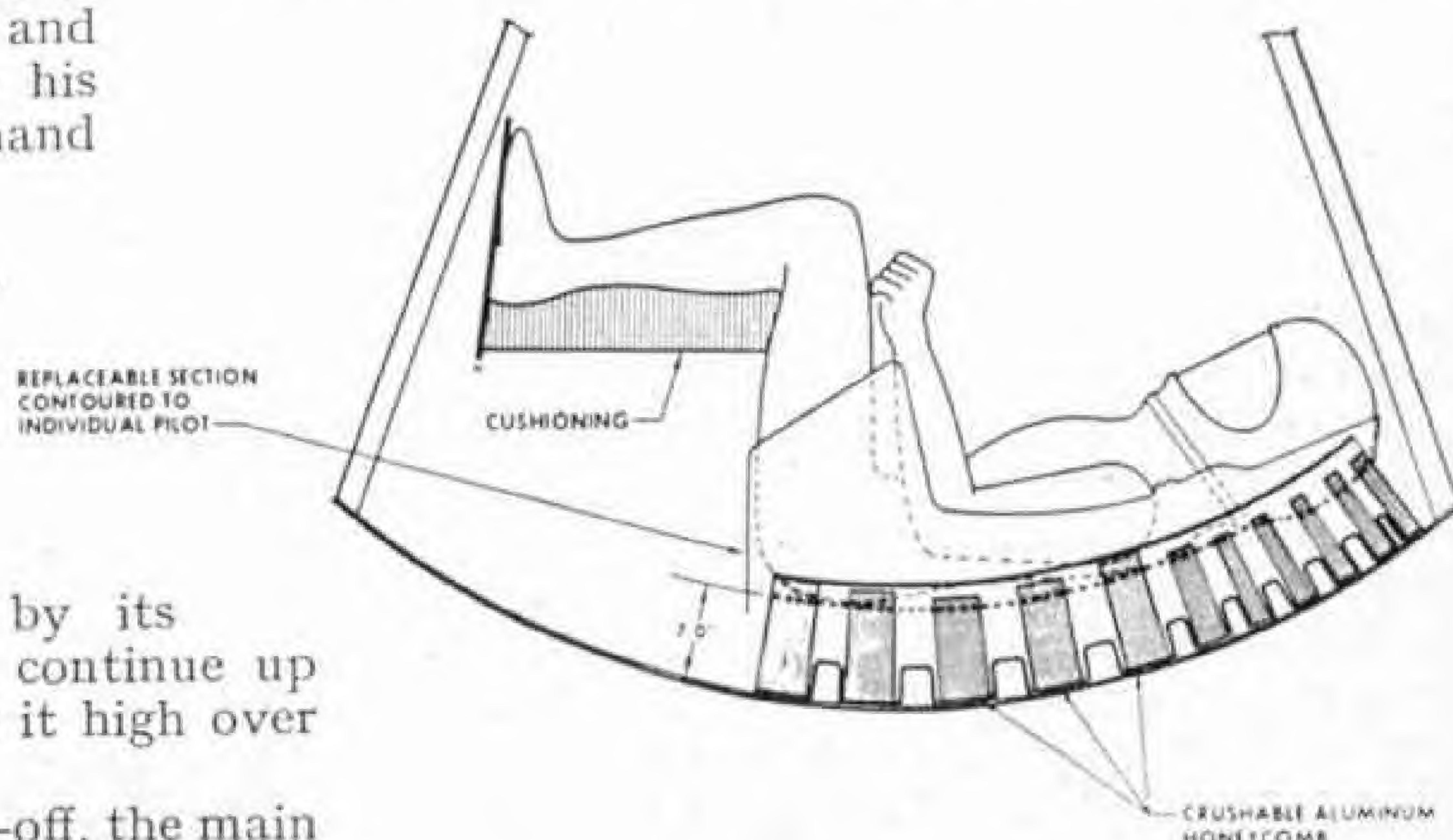
Tiny rocket jets will turn the capsule so that it travels with the curved face in front. Eventually, orbital flights of as long as a day will be made. But on this first journey into space, the airman will make only one, two or three orbits before a signal from the ground will fire the retro-rockets, to slow down the capsule and send it curving down towards the atmosphere. This will be the most delicate part of the whole operation. If it enters the atmosphere at the wrong angle or too fast, it will be burned up by air friction. If it begins its descent at the wrong point it may land in some remote area from where it might never be recovered.

If all goes well, the capsule will re-enter the atmosphere after another half-orbit and will be slowed quickly to about the speed of sound. As it does so, layers of plastic coating on the curved face will burn away, absorbing the heat caused by air friction.

About 13 miles above the Earth, a small drogue parachute will stream out from the stem of the capsule to stabilise it, and strips of foil will be released to enable the capsule's position to be pinpointed by radar. At about 12,000 ft. the main 'chute will open and the capsule will float gently to Earth.

If it lands ashore the (Continued on page 524)

LANDING SHOCK ATTENUATION



The Metrac

A Lorry That Climbs Walls

By Ian S. Balderstone

WHEN it comes to travelling over really rough country or surmounting natural obstacles, the horse and the mule even in this the space age still hold a definite advantage over most man-made means of transport. In spite of this, they have had to be replaced by so-called "all terrain" vehicles, which are much speedier and can carry far greater loads. Even they have shortcomings and limitations, however. After a great deal of thought on these, E. Meili, of the Schaffhouse Tractor Factory of Switzerland, reasoned that whether a

of two separate units, one forming the front portion and the other the rear of the vehicle, and it combines the agility of the quadruped with the load capacity of the motorised vehicle.

In looks the Metrac is similar to any normal six-wheeled vehicle apart from the fact that the Metrac's hamper, as it is called, which takes the place of the normal load container, is extremely low slung. One really only notices that the Metrac is a totally different vehicle when, from the driving position, the driver lifts at will the

front wheels, either together or one at a time, up to an angle of 30 degrees. Such aptitude is normally found only with beings gifted with muscles. The Metrac has these, in a way, but they take the form of an hydraulic system.

Another peculiarity of the new vehicle is that the front and rear wheel bases can be altered either while under way or at a halt. As a result, the bonnet and driving cabin can be tipped forward while the hamper leans back, or the vehicle can actually be bent up around its central transverse axis so that it becomes V-shaped.

And even on a gradient the hamper and body can be kept horizontal.

Thanks to its construction, the Metrac can overcome extremely difficult obstacles with which ordinary cross-country vehicles could not cope. Let's have a look at the Metrac at work in extreme circumstances.

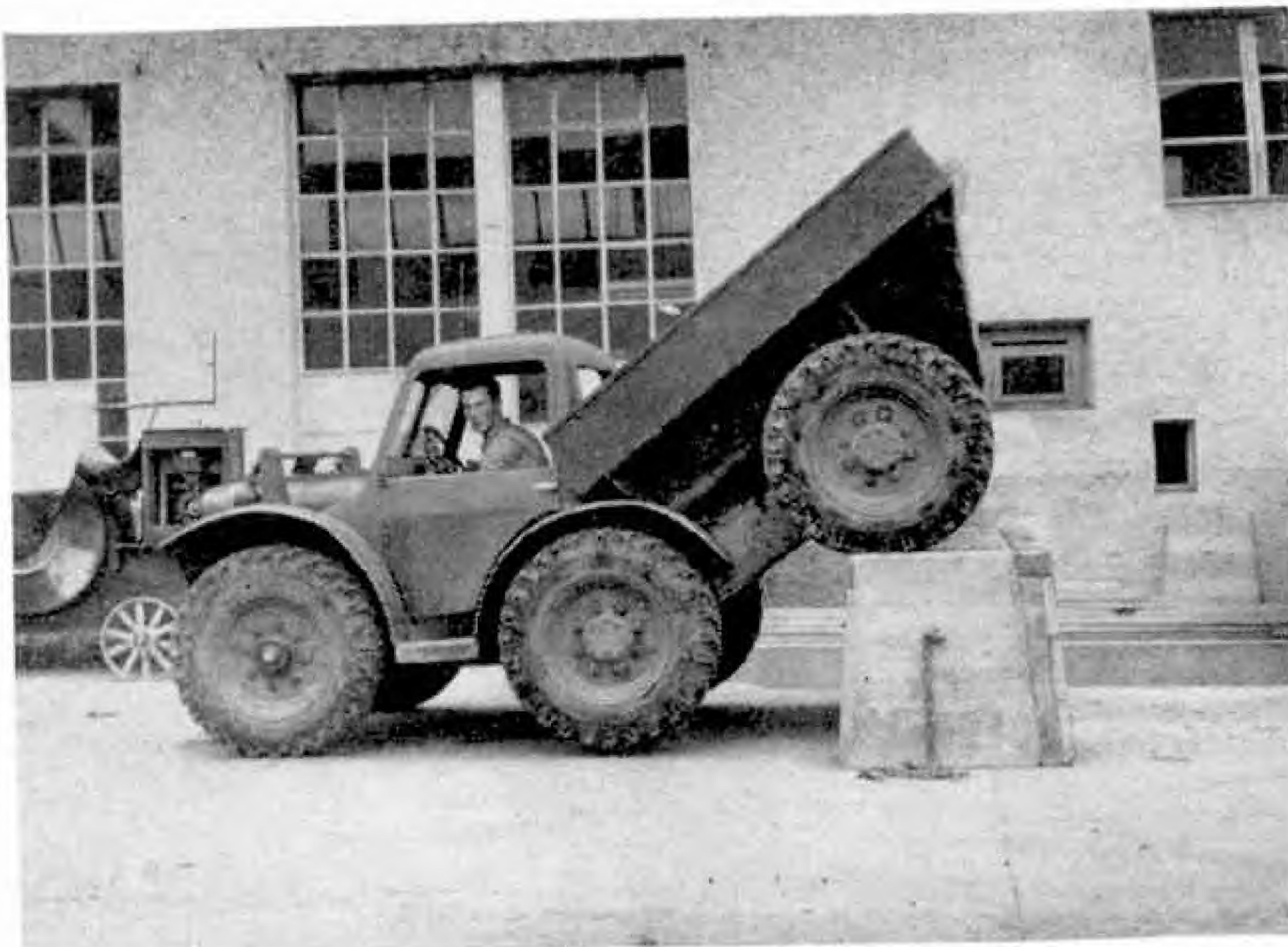
Conventional vehicles of the same length, but with a rigid chassis, cannot normally tackle an extremely steep slope since there is generally insufficient clearance between ground and body. The front and near wheels of the Metrac oscillate separately around the central axis, and as



Hills, banks, muddy streams—the Metrac, the lorry that can climb walls, deals with all of them without difficulty. Photographs by Max Pichler.

vehicle be on wheels or caterpillars, no changes or permutations in either power or dimensions could hope to improve matters. What was needed, he concluded, was nothing less than an entirely new principle of vehicle construction.

What Meili had in mind was a vehicle that could climb over a vertical wall at least equal in height to its radiator, or cross ditches with extremely steep banks. It is to his credit that he has succeeded in designing just such a vehicle, however impossible the task may have seemed. He calls it the Metrac. It consists, basically,



Here the Metrac is climbing over a low wall, its passage almost complete.

the middle wheels are driven as well as the others it can pass smoothly over the obstacle, its chassis just taking the shape of the bank.

No matter how favourable the "angle of attack", conventional vehicles—especially those with short, low bases—will inevitably get stuck in the ground nose forward when trying to cross a ditch with sides at an angle of say 45 degrees. The Metrac does not suffer this fate because its chassis adopts the shape of a V when the front portion of the vehicle is raised. The front wheels grip the bank firmly, while the rear wheels keep pushing the vehicle forward, until the front wheels are once again horizontal and moving normally.

When moving along a steep gradient, all conventional vehicles run the risk of falling over sideways. The hydraulic system of the Metrac allows the driver to lower front and rear wheels on the downward side, so giving it an almost horizontal position, and the centre of gravity is then displaced towards the hill to exclude any risk of tipping over. In any case, the centre of gravity when the

Metrac is fully laden is far below the level of that of other vehicles, as the bottom of the hamper is very low.

The way in which the Metrac climbs over vertical walls really distinguishes it from all other known makes of vehicles. Two stages in this astonishing performance are illustrated here and on page 475. The obstacle shown was surmounted going forward as well as in reverse, without outside help, the hydraulic system only being used to raise and lower the parts as necessary. Low walls or embankments are

easily climbed, and the Metrac can even drive itself on or off another vehicle!

The lifting or lowering of the extreme wheels presents other practical advantages. A notable one is that the hamper can be tipped to unload the contents without the assistance of auxiliary tipping machinery. Furthermore, when it comes to fitting chains or changing a wheel the Metrac really surpasses itself. For more speedy travel on roads as distinct from rough country, the distance between the front and rear wheels is shortened so that the centre wheels barely touch the ground.



Rough ground means nothing to this remarkable lorry, as its passage through a wood in this picture shows.



The up "Lakes Express" at Wigan in charge of converted Patriot 4-6-0 No. 45532 "Illustrious". Photograph by A. Crossfield.

Railway Notes

By R. A. H. Weight

Aboard the "Irish Mail"

This well known express service has operated for more than 100 years between Holyhead and London, Euston, conveying passengers, mails and baggage as part of the important through route between Dublin, or ports not far therefrom in what is now the Republic of Eire, and the English Metropolis. There are night trains and ships each way throughout the year, with an additional day service during summer as well as extra holiday ones. Through connecting trains are also run to and from Holyhead-Manchester, etc.

Holyhead Island, town and port, form a north-western outpost of Wales, connected to the Isle of Anglesey by a causeway carrying railway and road, with blue sea on each side when I was there in July. The V-shaped inner harbour has lengthy berthing space for British Railways' passenger and cargo vessels, and the trains are drawn up conveniently near to them, with covered accommodation for passengers, Customs officials and so on. My friend's good photograph shows *Cambria* arriving with 714 passengers aboard from Dun Laoghaire, near Dublin, 57 miles away, within a few minutes of booked time, 12.35 p.m., having made the passage in little over 3 hrs. Another fine motor liner, sister ship *Hibernia*, 4,972 gross tons, was waiting on the left to take the corresponding afternoon sailing outward.

More than half the inward passengers joined the principal L.M.R. express bound for Chester, Crewe, Rugby, London. As usual it was a heavy train, of 15 vehicles including a loaded mail van, kitchen and restaurant cars making a gross weight of fully 500 tons behind Britannia 4-6-2 No. 70045 *Lord Rowallan*, Holyhead engine and crew working throughout. Departure was punctual at 1.25 p.m., and 5½ hrs. was allowed for the 264 miles to Euston on a moderately fast schedule.

after that every signal was clear for more than 200 miles. Joining the West Coast main line just north of Crewe, a maximum lateness of 8 min. at Chester was gradually wiped out with good steady running not exceeding about 70 m.p.h., and but for a short wait outside Euston while a platform was cleared we should have arrived exactly at 6.55 after a comfortable and enjoyable journey.

Other L.M.R. Travels and Observations

While in N. Wales I was pleased to note many enterprising railway facilities for tourists, including the two sightseeing special trains making circular day tours from the coast resorts of Rhyl, Colwyn Bay, Llandudno or Llandudno Junction. These tours take in Caernarvon, Harlech, Barmouth, Bala Lake, Corwen and the Clwyd Valley, a most extensive round partly over single lines and in W.R. territory, and make the rounds in both directions.

I saw the *Welsh Chieftain*, with an ex-Pullman observation lounge car at rear, terminate at Rhyl. The 5 centre-corridor coaches carried the nameboards *Gwynedd*, *Llywelyn*, *Glendower*, *Owen Tudor* and *Powis*. The *Cambrian Radio Cruise* was formed partly of armchair-fitted saloons fitted with broadcasting equipment. Each train had a cafeteria car, and the locomotives were respectively Nos. 75028 and 75033, class 4 B.R. 4-6-0s with headboards. From Llandudno Junction to the town station after reversal, 2-6-2T No. 41237 was in charge of the second train for its final short stage.

The *Snowdonian*, a smart 6-coach outfit headed by standard 2-6-4T No. 80088, arrived back at Llandudno Junction from Llanberis, whence passengers had the opportunity of sampling the Snowdon Mountain Railway.

The *Welsh Dragon* fast local diesel service to and from Llandudno-Colwyn Bay-Rhyl was well patronised. We enjoyed splendid views from the large, end windows of an express diesel set from Bangor across the Menai Strait and Anglesey to Holyhead.

The holiday season and Bank Holiday periods necessitate the running of numerous excursion and relief trains along the N. Wales coast lines from the Midlands, Lancashire and further afield. Some are formed of diesel sets, but many locomotives and varieties of rolling stock hailing from all sorts of stations or depots may be observed.

While at Crewe later last summer I noted how quickly the 2,000 h.p. diesel-electric express locomotives numbered in the D210 and D220 series were coming into service. No. D218 was in well before time with

The first 60 miles or so are delightfully scenic, beginning across Anglesey with some sharp gradients, and the Welsh mountains are visible, first almost ahead and later on the right. The train sweeps round as vistas of the Menai Strait appear, and it crosses the picturesque seaway as if in a tunnel by means of Robert Stephenson's famous Britannia tubular bridge, "guarded" by sculptured lions. Telford's graceful, still older, road suspension bridge is glimpsed among the trees.

We were now on the Welsh mainland and beyond Bangor travelled for many miles close to the sea with a wonderful variety of marine and rural views. At romantically situated Conway, close to the ancient Castle, we traversed the shorter and experimental Stephenson tubular bridge, still rendering good service, like other such centenarian structures.

We were almost stopped twice by signals near Prestatyn, before leaving the N. Wales shore, but

the fast northbound *Lancastrian*, "13-on", going forward to Liverpool and leaving the longer Manchester portion to be taken on by a Scot 4-6-0. A lively run behind No. D226 that I logged in the *Midday Scot* will be reported shortly. Meanwhile I have been behind an unrebuilt Patriot, No. 45544, working through from London to Preston, and No. 44739, a "black five" with Caprotti valve gear from Chester to Rhyl. I have also noted a number of standard engines of that ubiquitous type on my own or other trains on the Manchester-Southport and neighbouring busy routes.

At Euston on a Friday evening double-headed arriving expresses seemed unusually interesting. The *Lancastrian* from Manchester, "14-on" had Britannias Nos. 70031 *Byron* and 70043 *Lord Kitchener*. The lighter semi-fast from Morecambe, Preston, etc., was headed by Scot and Jubilee 4-6-0s Nos. 46129 *The Scottish Horse* and 45684 *Jutland*. *The Red Rose* from Liverpool, "16-on" and in 3 min. early, had class 5 No. 45421 and Scot No. 46106 *Gordon Highlander*.

B.R. 8P 4-6-2, No. 71000, *Duke of Gloucester*, came in punctually from Crewe on the *Midday Scot*; outward the 8.30 p.m. Postal Express was taken by Scot No. 46101 *Royal Scots Grey*, and the *Irish Mail* by unnamed Britannia No. 70049. Double heading with two 4-6-0s is a recognised practice if a 4-6-2 is not available for certain trains.

New Speed Records

Electric locomotive hauled, one of the accelerated Lille-Paris expresses composed of five stainless steel special first class coaches was this summer allowed only 29 min. for 41 miles, Arras-Longueau, start to stop, thus capturing from the United States a world record of its kind, the average speed being over 84 m.p.h.!

Britain's fastest train, *Bristolian*, during two London-bound runs in the first week of the 100-min. timing for 117½ miles from Bristol to Paddington, attained maximum speeds of 100 m.p.h. and just over at three separate points in the course of each journey. More usually the highest figure is around 90 m.p.h. The train was of seven coaches hauled by B-B Warship class No. D804 *Avenger*.



The mail ship "Cambria" from Eire coming alongside the quay at Holyhead.
This fine scene was photographed by C. A. Gostling.

Glasgow Exhibition Attractions

Readers and enthusiasts in Glasgow during September were able to see fine exhibitions at Central Station, including locomotives, rolling stock, model railways and cinema films, with relics and smaller items at the Mitchell Library, organised by the Stephenson Locomotive Society.

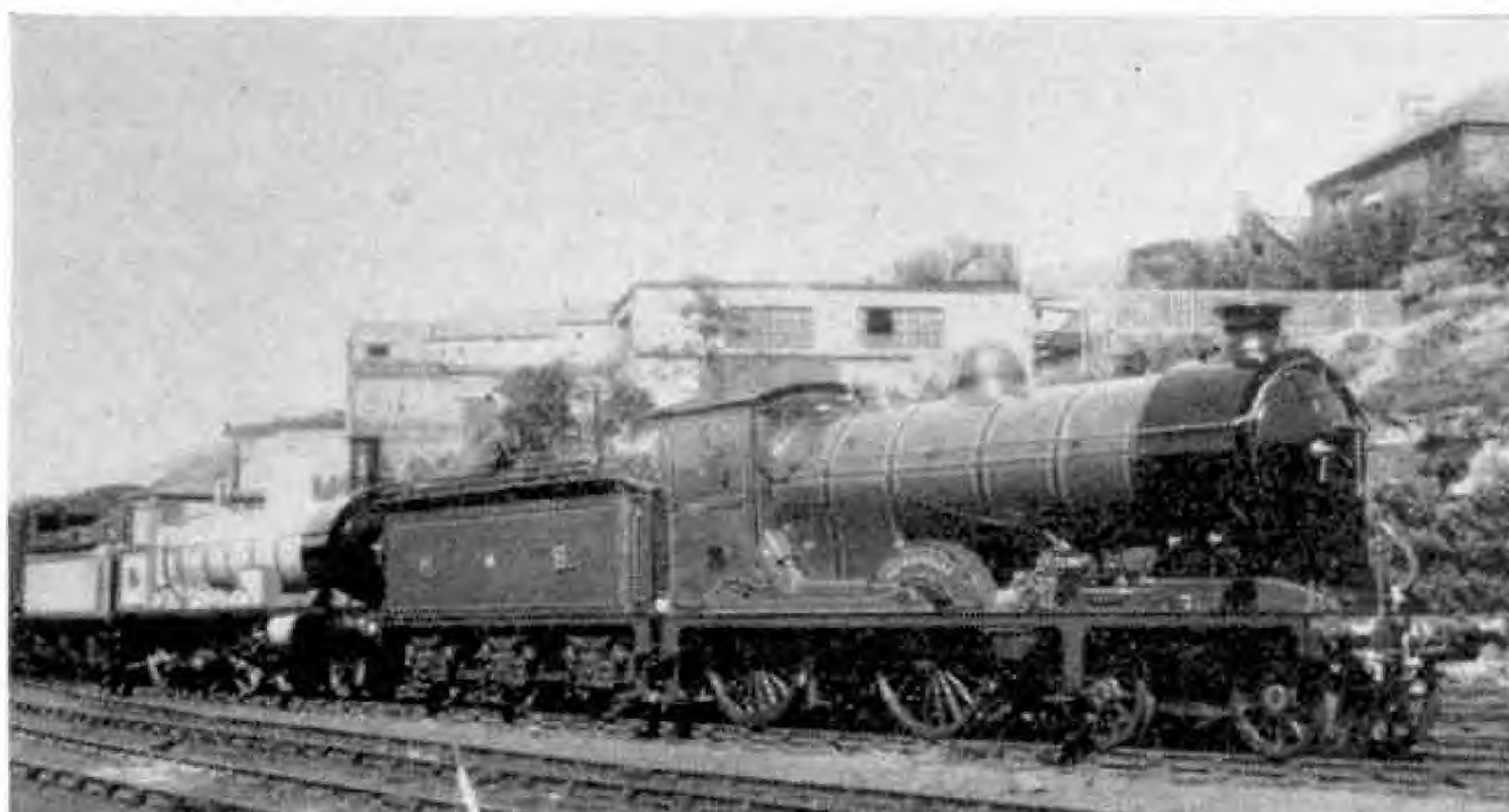
From a wide area of Scotland on different days fascinating special excursion trains to Glasgow, some arriving at Kelvin Hall Exhibition station, were hauled by restored veteran locomotives in old company liveries, comprising in addition to the two appearing in the accompanying photograph ex-G.W.R. 4-4-0 *City of Truro*, the Scottish 4-4-0 *Gordon Highlander*, Great North of Scotland No. 49, and the famous Caledonian 4-2-2 No. 123.

Progress Reports

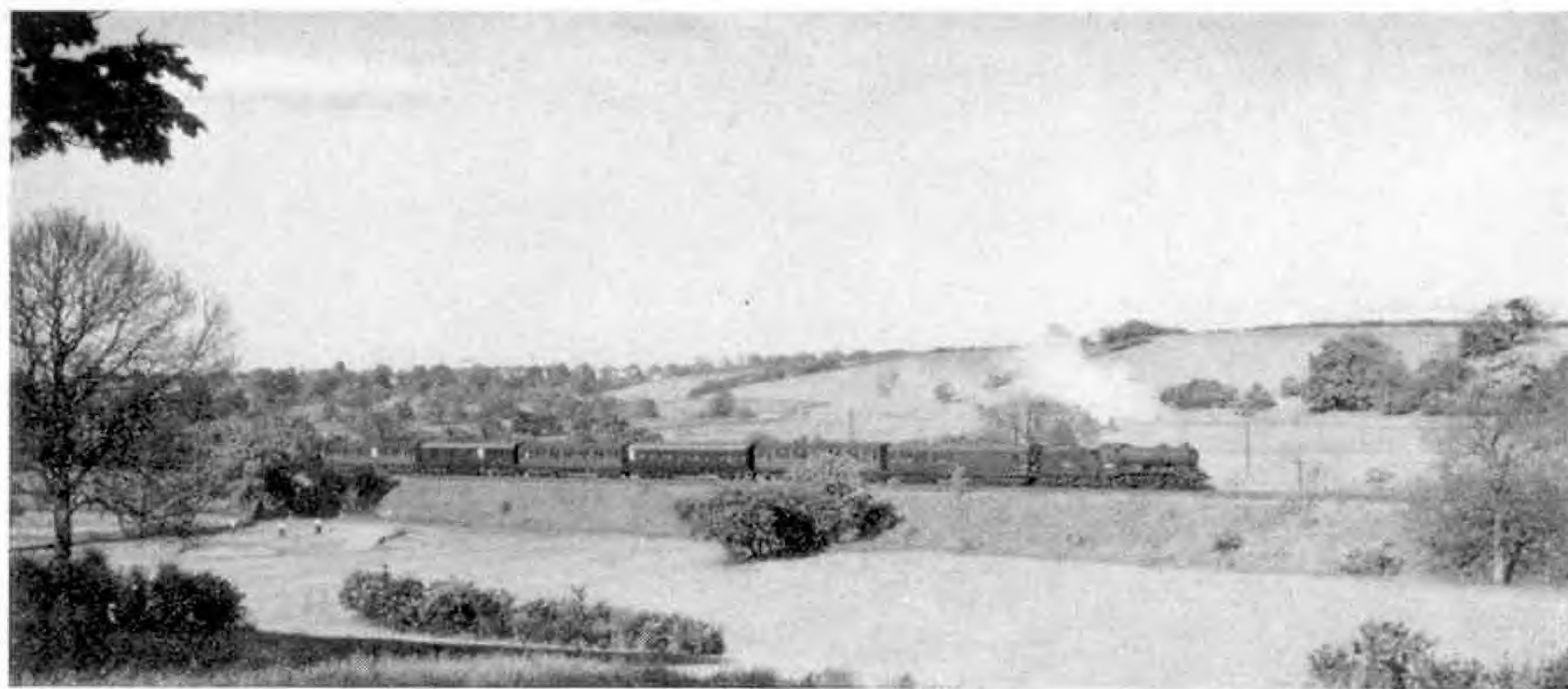
A new kind of self-propelled diesel coach of the railbus type, brightly painted in yellow, red and brown, is remarkably equipped as a track recording unit for B.R. engineers. Any irregularities in track levels, curvature and the like passed over are electrically recorded and measured. Latest automation technique is employed.

Part of the City Station, Leeds, is to be entirely reconstructed and modernised. Central Station will eventually be closed and trains diverted to City by way of a new fly-over approach. Big improvements are in hand also at London Road, Manchester, Coventry, Peterborough and elsewhere.

The first of the 3-car multiple unit electric train sets in blue livery intended for Glasgow suburban services, when the 25 kV. a.c. installation is ready, has been on exhibition as well as making trial runs near Manchester, while others are under construction. Structural and signalling extensions and modernisation around Glasgow and other stations are in hand. The first trains will run next year.



Two of the preserved locomotives that were used on excursion trains in connection with the Scottish Industries Exhibition. They are respectively North British 4-4-0 No. 256 "Glen Douglas" and Highland "Jones Goods" 4-6-0 No. 103. Photograph by C. Lawson Kerr.



A race special near Collingham returning to Leeds from Wetherby in May last. This photograph and the one on which our cover is based are by K. Field.

Wetherby Triangle

By Yorkshireman

WETHERBY Triangle is between the Tadcaster-Harrogate line and that from Leeds to Wetherby. From Wetherby Town Station, at its South Junction, lines curve left and right to join the Tadcaster-Harrogate line, the former in the direction of Harrogate and the latter towards the Wetherby Old and Race Course Stations; the tracks of the right-hand curve cross the Great North Road as they approach the former station. Our cover this month shows special trains at the South Junction during the race meeting in May last.

Wetherby Town Station has long since taken on an air of rurality. Its earlier counterpart, Wetherby Old, sleeps in the memories of the heydays of the former Great Northern Railway Atlantics racing for Harrogate from London and the one time Pullman services that passed by its platforms. Now these see only the odd freight and pick up goods, coastal excursion or Sunday traffic diverted through the station when engineering work makes this necessary, and Town Station handles the few passenger trains. Of the three daily from Leeds one terminates there, one extends to Thorp Arch Depot on the Tadcaster line, while the third runs to Harrogate.

In the reverse direction three Harrogate-Leeds trains, one from Church Fenton and one originating at Wetherby make up the daily total, with two added and one deleted on Saturdays. These include both diesel multiple units and steam trains.

The Triangle carried heavy services in

bygone years. Some of them were circular trains, Leeds-Wetherby-Church Fenton-Leeds, but the heaviest days of all were race days at the local course, where a special station and yard near the course filled to overflowing with race stock and horse vans.

Motor transport has changed all this, even B.R. running long distance road horse boxes now. The May race meeting of this year produced only five specials, which were all handled at Town Station. They were turned and stabled on the Triangle, aligned for return, all regular traffic being cancelled except the 4.55 p.m. to Leeds, which starts from Harrogate. Two trains from Leeds occupied the Triangle base lines.

Our cover shows a scene during these operations. A special, headed by J39 No. 64870, had emptied in Town Station, and is pictured on the south to west curve passing the train headed by No. 64866 from Harrogate. This had already cleared her passengers in the station and had backed up the line, to await the arrival of a special from Sheffield, headed by No. 44070, coming off the Tadcaster line.

This latter train was worked forward to Collingham on the Leeds line, the engine returning to Wetherby to turn on the Triangle and take on water. No. 64866 then came forward, backed her train around the south to east curve and then ran along the base of the Triangle to a position on the Harrogate line, facing home. At departure time she had only to back down the west-south curve to Town Station for loading, to take her train away on the same line.



Welding Giant Steel Pipes

By the Editor

THE striking scene above shows two welders at work on three 6 ft. steel pipe lengths to make a section of piping 18 ft. in length and measuring 10 ft. 4 in. across. The giant pipe for which these 18 ft. lengths were needed is to carry water from the Tinaroo Falls Dam, at present under construction in North Queensland, Australia, by the Queensland Irrigation and Water Supply Commission, to an area of about 100 square miles, to help in the development of country that so far has been only partially settled.

The primary purpose of the scheme is to supply irrigation water for growing tobacco and to add to the water available for other crops, including vegetables, cotton, peanuts, maize and tropical fruits.

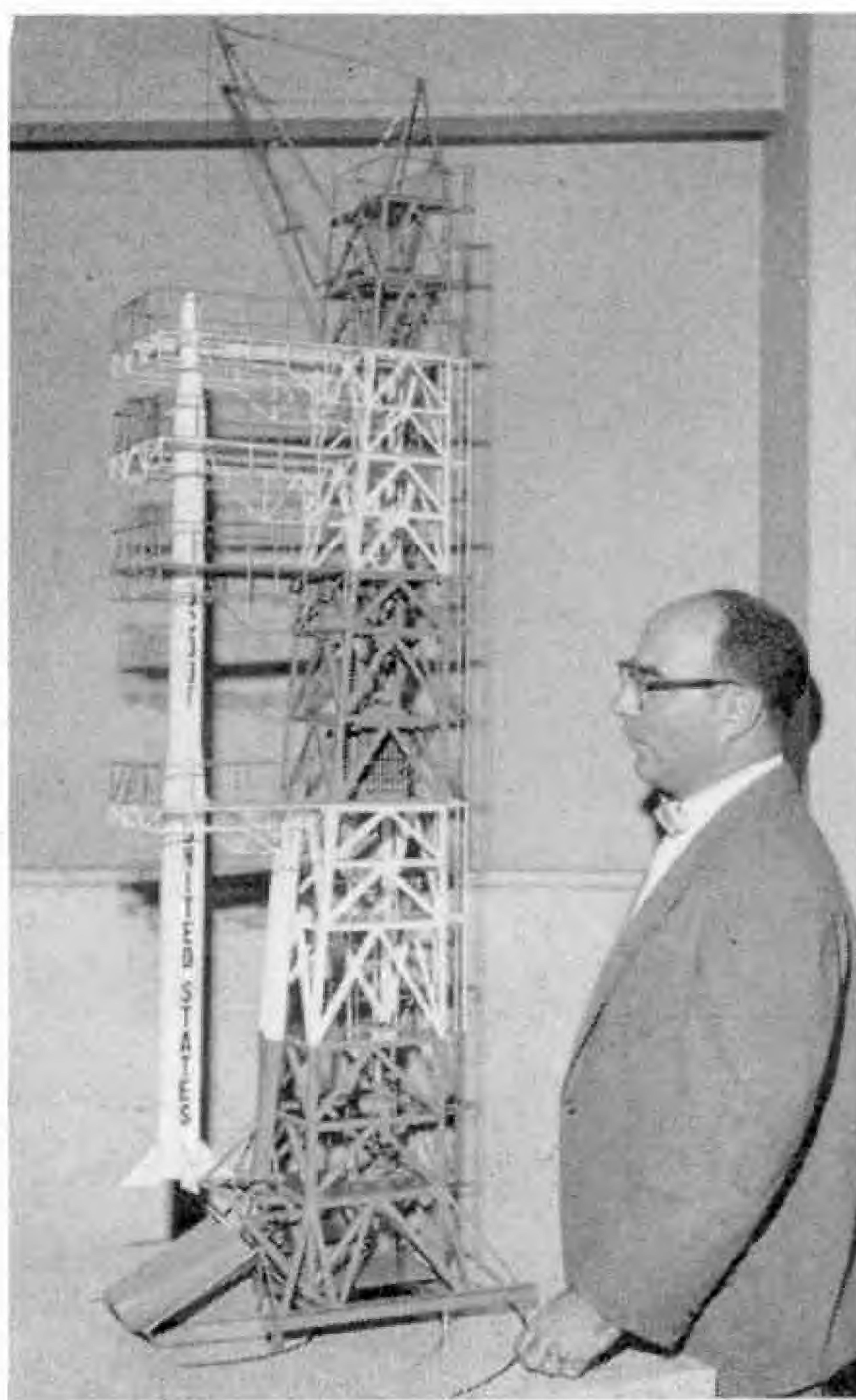
The main outlet channel from the Dam, with its branches, will be more than 200 miles long. In its first six miles this outlet, a giant reinforced concrete pipe, will cross a number of gulleys. Some of these are being filled in with earth or rock, but there are seven of them that cannot be dealt with in this way, and there what are called inverted siphons are being constructed. These dip down to the bottom of the gully on one side and rise on the other, and the water will flow through them naturally

because of the steady descent in level of the piping system.

It is in the very deep gulleys that the steel pipes seen above are used to form linings in the concrete pipes, those in which the head of water is more than 80 ft., and the water pressure at the lowest point correspondingly high. The total length of all the siphons will be about 8,500 ft., and nearly 3,000 ft. of the welded steel liners is necessary.

Steel for the liners reaches the works in the form of sheets 16 ft. 4 in. long and 6 ft. wide, and $\frac{1}{4}$ in. thick. Two of these are first welded together along one of the 6 ft. edges. The larger plate thus formed is then passed through a set of rollers that bend it into the finished pipe, after which the seam is itself welded.

This gives three 6 ft. pipe lengths, and it is each set of three in turn that is welded together to form the 18 ft. lengths, as shown in the picture. As there are two seams around the circumference to be welded, two welders are needed to carry out the work. The 6-ft. lengths are placed on a roller bed and tack welded in position. Then welding begins. A drive unit, seen in the front of the illustration, turns one of the rollers on which (Continued on page 524)



A scale model of the Chance-Vought Scout, which on account of its comparatively low cost has been called "the poor man's rocket".

The Scout

A British commission headed by Prof. H. S. W. Massey has agreed to provide instrumentation for up to three satellites. The satellite to be used is the Scout, which is at present being developed. A picture of a scale model of the Scout and its launching tower, and a drawing of the rocket appear on this page.

The first British instruments will be in orbit by mid-1961. Everything except

the instruments, that is the launching vehicle and facilities, the transmitter and batteries,

Space Notes

By

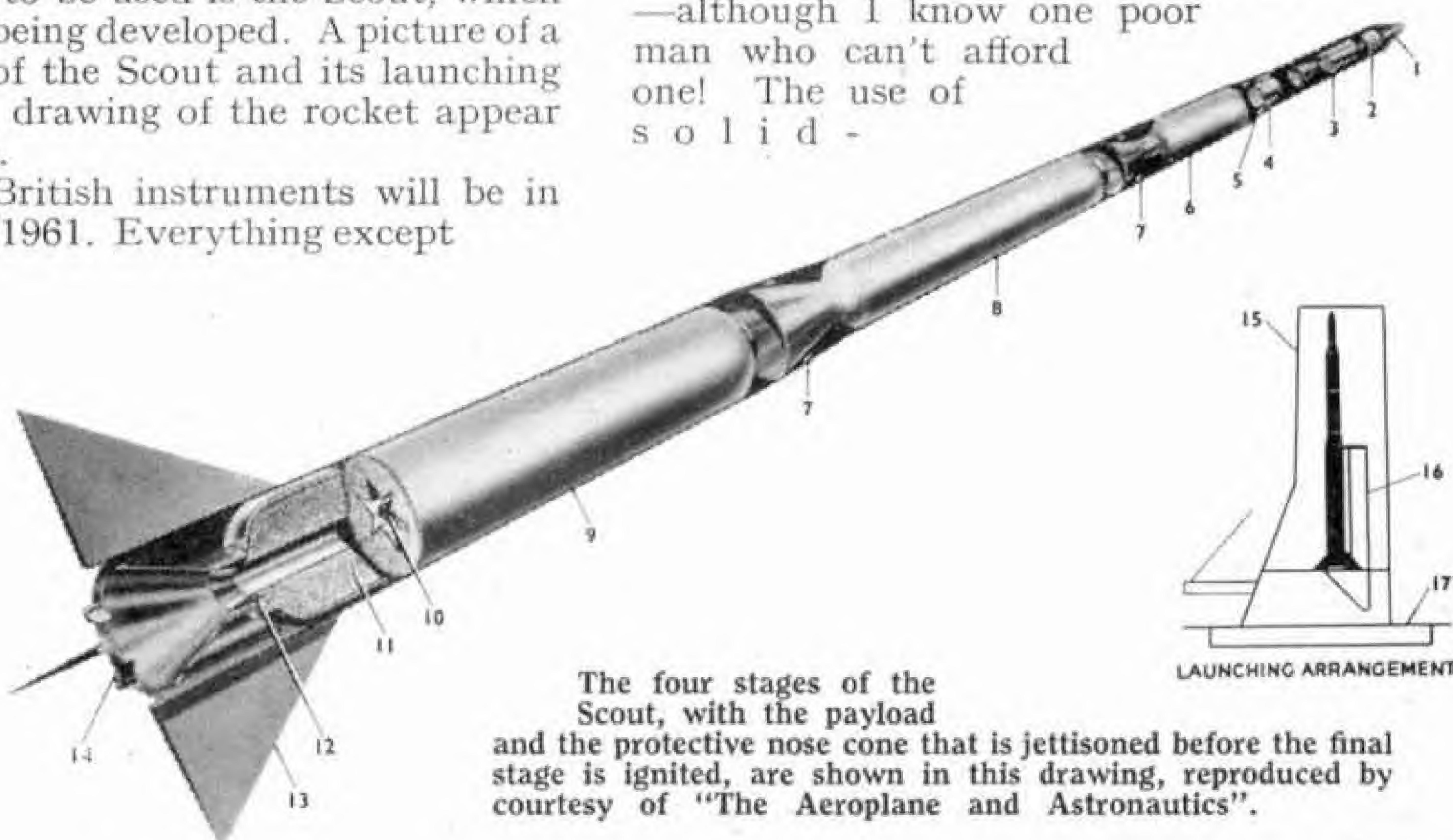
J. Humphries, B.Sc.(Eng.),
A.M.I.Mech.E., A.F.R.Ae.S.

will be provided by the Americans. The planning of the experiments has already begun and by the end of the year there will be ten teams working on them. Between £100,000 and £200,000 a year over a four-year period is being provided by the British Government for this work, and altogether ten or more experiments are to be flown—that is three or four per satellite. No animals will be sent up during the course of this work.

Scout is to be a four-stage solid-rocket propelled vehicle, and its development is being undertaken by the Chance-Vought Aircraft Co. for the National Aeronautics and Space Administration. It will be 70 ft. long and 35,000 lb. in weight, and is the first space project to be tackled by the firm. NASA officials say the vehicle will be able to put a 150-lb. payload into a 300-mile orbit, and that in high altitude probe shots it will send a 100-lb. load to over 5,000 miles. It will be used for space, orbital and re-entry research.

The cost will be around \$500,000 each, very much less than any other comparable vehicle, and for this reason it is commonly known as "the poor man's rocket"

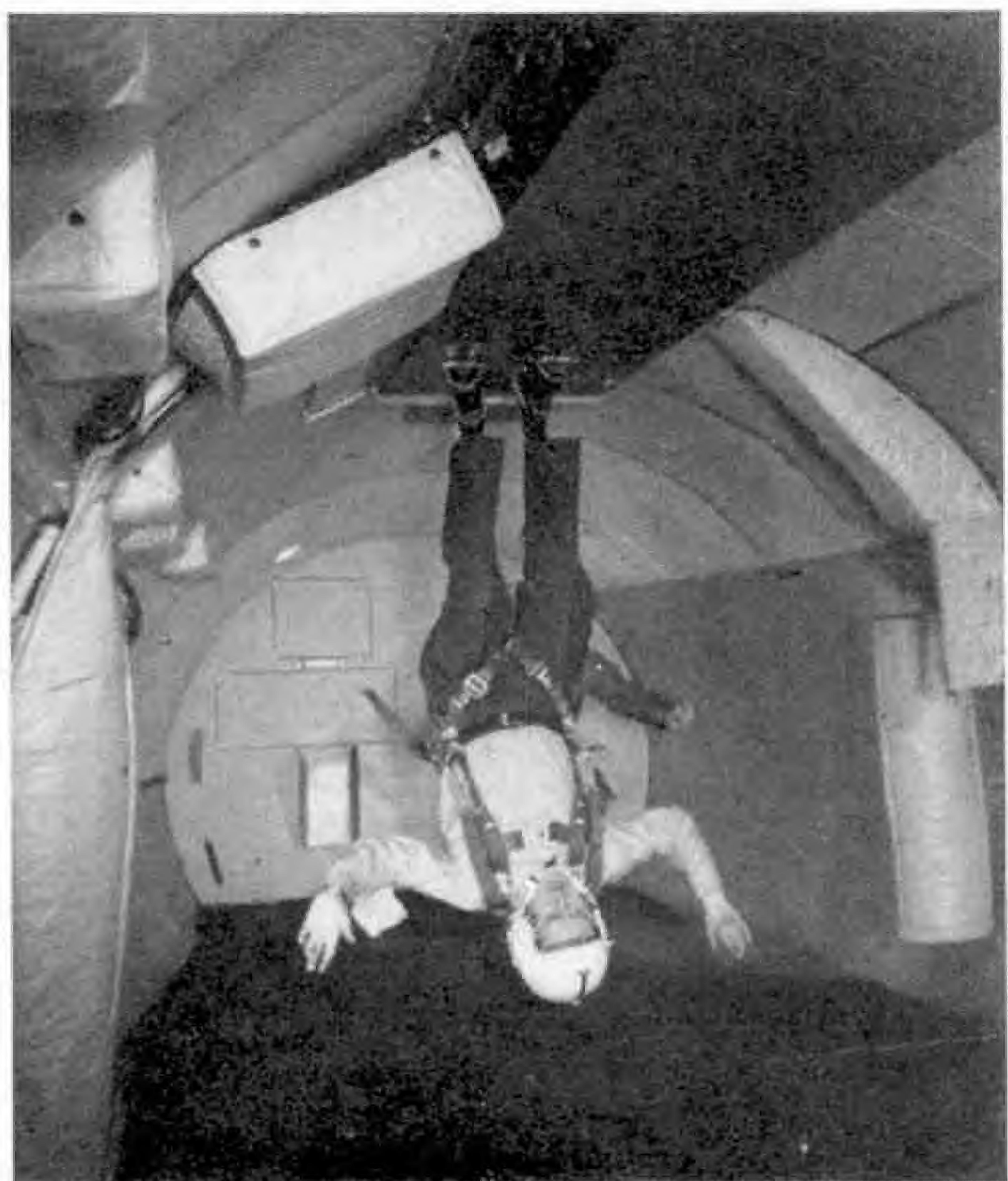
—although I know one poor man who can't afford one! The use of solid -



The four stages of the Scout, with the payload and the protective nose cone that is jettisoned before the final stage is ignited, are shown in this drawing, reproduced by courtesy of "The Aeroplane and Astronautics".

propellant rockets will simplify launching procedure, as fuelling facilities will not be needed. Most of the rocket motors can be purchased "off the shelf" and as fully developed items can be expected to give maximum reliability. So far only about 30 per cent. of the American satellite firings have been successful; more reliability is obviously needed.

The rocket motors to be used are as follows:—first stage, a modified version of an early Polaris missile motor; second stage, an improved Sergeant; third stage, a new rocket that will be a scaled-up version of



No, there is nothing wrong here. The picture is right way up. Upside down seems as good as right way up in a Wright Development Center zero gravity chamber.

the Vanguard third stage; fourth stage, similar to the Vanguard third stage. A simple gyro guidance system will be provided together with a fourth stage spin-up stabilisation device.

Zero Gravity Experiments

For a number of years now zero gravity conditions have been obtained in fighter aircraft by flying in what is known as a Keplerian path, and a large number of tests on human beings have been made in the confined space of the aircraft cockpit.

Recently the Wright Air Development Center has modified a Convair C-131 B transport aircraft to provide a "zero gravity

chamber" a little over 6 ft. high, about 10 ft. wide, and 25 ft. long. In this space human beings can float, without restraints of any kind, for periods up to 15 seconds. This allows such problems as orientation and individual propulsion in space to be studied.

With a little practice it is possible to manœuvre in this space using swimming motions as though it were filled with water, as seen in the picture on this page, but such motions of course are not as effective as they are in water. It is also possible to tumble over and over. This is

accomplished by tucking the knees under the chin, thrusting the arms out and rotating them vigorously. With practice several rotations can be made during the 15 second weightless period, but it produces extreme disorientation in all subjects, bordering on severe vertigo at times.

Moving in a satellite or spaceship can also be demonstrated by pushing off gently from one end of the cabin and floating to the opposite end. It has long been thought that lack of gravity may affect the carrying out of physical tasks, and testing this will be the main investigation for which the C-131 B is to be used.

One of these tasks is the operation of various kinds of switches and levers. One apparatus has a vertical lever, a horizontal lever, a rotary switch, a push-button switch and a toggle switch, which must be operated in a given sequence. Preliminary results show no serious falling-off in performance as a result of zero gravity.

Radar Space Observatory

Members of the University of Michigan have proposed a radar space observatory, rotating round the Moon, containing a nuclear power source to determine where on the Moon the first landing should be made. The behaviour of radar signals from it bounced off the Moon could give a good picture of the composition and depth of the Moon's top layer and some indication of the firmness of the under layer. According to some astronomers the top layer of dust may be tens of feet thick, and in that case present-day rockets landing on the Moon would just disappear from sight! At the time of writing the Soviet rocket that hit the Moon is not known to have given any guidance on this. The signals could also be used to determine contours and heights of mountains and depths of craters.

(Continued on page 524)

Air News

By

John W. R. Taylor

The Scimitars of No. 807

A star item of this year's S.B.A.C. Flying Display at Farnborough was the superb formation aerobatics by Supermarine Scimitar fighters of the Royal Navy's No. 807 Squadron, led by Lt. Cdr. K. A. Leppard. But No. 807 is no mere demonstration team. Already its pilots have completed many months of hard training from the Naval Air Station at Lossiemouth, and early next year it will embark on H.M.S. *Ark Royal* as a fully-operational combat unit.

In addition to being a formidable single-seat day interceptor, with the highest rate of climb and speed of any British warplane yet in service, the Scimitar is replacing the Sea Hawk in the fighter-bomber role. The illustration at the top of this page shows one of No. 807's aircraft, identified by the scimitar badge on the fin, firing a salvo of rockets. It can carry 24 of these weapons, or atomic bombs or photo-reconnaissance cameras, in addition to its fixed armament of four 30 mm. cannon, and is sturdy and controllable enough to flash in to an attack at sea level.

Nos. 800 and 803 Squadrons are also equipped with Scimitars, which are powered by two Rolls-Royce Avon turbojets. Together with the Sea Vixen all-weather fighters now entering service, they are more than a match for any bomber yet delivered to foreign air forces.

Supersonic Tortoise

Fastest tortoise in the world is Flt. Lt. Elbert du Crosses, the tiny Mediterranean spineless tortoise mascot of No. 20 (Hunter) Squadron stationed at Gutersloh in Germany. Since he was bought from a



A salvo of rocket projectiles has just been fired by this Vickers Supermarine Scimitar of the Royal Navy's No. 807 Squadron. The rocket projectiles can be fired in any combination from a single shot to 24 at once. Photograph "Flight" copyright.

pet shop in Oldenburg in 1955, he has flown over seven countries in 11 types of aircraft, with R.A.F., Canadian and U.S. pilots, and has been through the "sound barrier" 15 times.

Other normally-slow creatures that have been getting a move on lately are the 90 Irish caterpillars which emigrated to Canada on board an Irish Air Lines Super Constellation. When they hatch into moths next spring they will be released into Canadian wheatfields, where it is hoped they will attack the ragwort which is such a nuisance to farmers. If the first 90 immigrants do their work well, they will be joined by many more in the years ahead.

John Taylor's Monoplane

The neat little single-seat monoplane illustrated below has been designed and built by Mr. John Taylor, of Ilford, Essex—unfortunately no relation of mine! It was no easy task, because he had only £100 to spend on it, had never done anything of the sort before, and had to build it in an upstairs dining room, only 16 ft. by 11 ft. in size. This, and the fact that the fuselage and wings had to be passed out of the window on completion, limited the size of the aeroplane, which spans only 21 ft. and is 15 ft. long. Loaded weight is 610 lb.

Construction is of wood, except for the fabric covering on the wings and tail, and the little machine is powered by a 38 h.p. J.A.P. engine. Pilots who have flown it say it handles delightfully, with a top speed of 104 m.p.h. and a stalling speed of only 38 m.p.h. with flaps down.

Helicopter Orders

Splendid news for Faireys is that B.E.A. have confirmed that they will order six Rotodyne helicopters for service in the mid-sixties. Following orders from New York Airways



The little single-seat monoplane designed and built by Mr. John Taylor, of Ilford, Essex. Photograph by Douglas N. Maw.

and Okanagan Helicopters of Vancouver, and an announcement that the Rotodyne will almost certainly be used to transport British Army units, this seems to assure a bright future for this world-beating aircraft.

Earlier this year Lord Douglas of Kirtleside, Chairman of B.E.A., told Fairey Aviation that B.E.A. would place an order for a developed version of the Rotodyne, using Rolls-Royce Tyne engines, provided the aircraft fulfilled all B.E.A.'s requirements. Among

transport or air ambulance, or for anti-submarine and rescue work at sea. An unusual feature is that all its fuel is carried externally in torpedo-shaped tanks on each side of the cabin. These would help it to float if it made an emergency landing on the water.

The Frelon is 47 ft. 7 in. long, with a rotor diameter of 49 ft. 3 in. Its normal loaded weight is 16,550 lb. and it has a range of 300-600 miles at a cruising speed of 125 m.p.h.

Twin-Turboprop Air Liners for B.E.A.

B.E.A. are to receive three Handley Page Heralds for use on their Scottish routes, and three Avro 748s. These two types of aircraft are very similar, each being powered by two Dart turboprops and carrying 40 passengers over short and medium-length stages. So it seems likely that the main purpose of the contracts is to give them the prestige of having been ordered for a British national airline.

The Avro 748 has, meanwhile, been chosen to replace the Indian Air Force's veteran Dakotas, against strong competition from foreign types. Initial deliveries will be made from England, but production under licence in India is expected to be under way by 1961 and the

£20-25 million contract provides for this. As a result, it seems likely that the 748 will in due course supersede also the 60 or more Dakotas used by Indian internal airlines.

1,500 m.p.h. Fighters Fly Atlantic Non-Stop

Six U.S.A.F. pilots recently flew their Lockheed F-104C Starfighters non-stop across the Atlantic from Myrtle Beach, South Carolina, to Moron Air Base near Seville, Spain. The aircraft were each refuelled three times during the 8 hr. flight by KB-50J tankers.

In the illustration below, two F-104Cs are shown pulling up to a KB-50J, which is trailing refuelling hoses from pods at each wing-tip and from its extended tail-cone. A 6½ ft-long probe, extending from just below the cockpit of the fighter, has to be rammed into the funnel-shaped drogue at the end of the hose, after which fuel flows automatically from tanks inside the KB-50J.

Jet engines in pods under the tanker's wings help to give it a top speed of 445 m.p.h. in level flight.



Sud-Aviation SE.3200 Frelon (Hornet), the largest helicopter yet built in France.

those requirements are a 200 m.p.h. cruising speed with 60 passengers, and an acceptably low noise level for operation into the centre of cities.

After close observation of the aircraft's progress and development, and after further discussions with the Fairey Company, B.E.A. are satisfied that the Rotodyne is likely to meet their needs.

Equally welcome is the news that Saunders-Roe have been given the go-ahead on a version of their five-seat P.531 helicopter for the British Army. The latest mark of the P.531, flown for the first time on 9th August last, has a 650 h.p. Blackburn A.129 engine, giving a range of 322 miles at 115 m.p.h. It will be used also by the Royal Navy for anti-submarine duties, flying from small platforms on frigates.

Biggest French Helicopter

More helicopter news, this time from France. First flown on 10th June this year, the Sud-Aviation SE.3200 Frelon (Hornet), illustrated above, is the largest helicopter yet built in that country. Its four-blade main and tail rotors are driven by three 750 h.p. Turbomeca Turmo III shaft-turbines, mounted above the cabin, and it can carry more than 20 passengers. Alternatively, it can be used as a heavy freight



Lockheed F-104C Starfighters refuelling in the air from a KB-50J Superfortress tanker.



"Group Flash Three"

Life on the Owers Light Vessel

By D. R. Jefferson

THE English Channel is one of the busiest shipping lanes in the world. If you look at a chart of the area, you will notice many lights to guide traffic along this lane after dusk. There are winking buoys, lighthouses and light vessels. Of the latter there are five—Varne, Royal Sovereign, Owers, Calshot Spit and Shambles.

A closer examination of the chart will show the position of Owers Light Vessel as seven miles south-east of Selsey Bill. And it was to this position that I was to be delivered late one afternoon in a sailing cutter. The crew of the light vessel had spotted us some two hours earlier, and they were ready for us. They had fenders out over the side, and they had dropped a rope ladder. We closed within about four feet, and then I leapt for the ladder and scrambled aboard this unusual type of vessel.

After a few hours on Owers, I realised that the difference between a light vessel and the numerous passing ships is not so very great. There is the familiar throbbing of the generators, continuous 24 hours of the day and producing a sound all over the ship, giving the impression that she is under way. Only the motion of the ship dispels the illusion, for the light vessel is always riding to a heavy anchor chain.

Group Flash Three, repeated every 20 sec., identifies the Owers Light Vessel, on station seven miles south-east of Selsey Bill. This is illustrated above, and the accompanying article gives interesting information about lightships in general, by one who has seen for himself what life aboard such a vessel is like.

This is particularly noticeable in rough weather, when she can develop an uncomfortable pitching motion with the cable continually tugging at the bows.

The routine on board is very similar to that of a sea-going vessel. There are watch-keepers on duty throughout the day and night, and in many light vessels they work to the watch-keeping system operated in the Royal Navy, working 4 hours on duty

followed by eight hours off. The two duty watch-keepers are always on the alert for ships in trouble. If distress signals are sighted, help can be summoned over the radio-

telephone. Many of the light vessels mark dangerous shoals, and the watch-keepers must keep a look out for any ships that are running towards the danger. They must sometimes fire cannon or rockets as a warning to ships that are standing into danger.

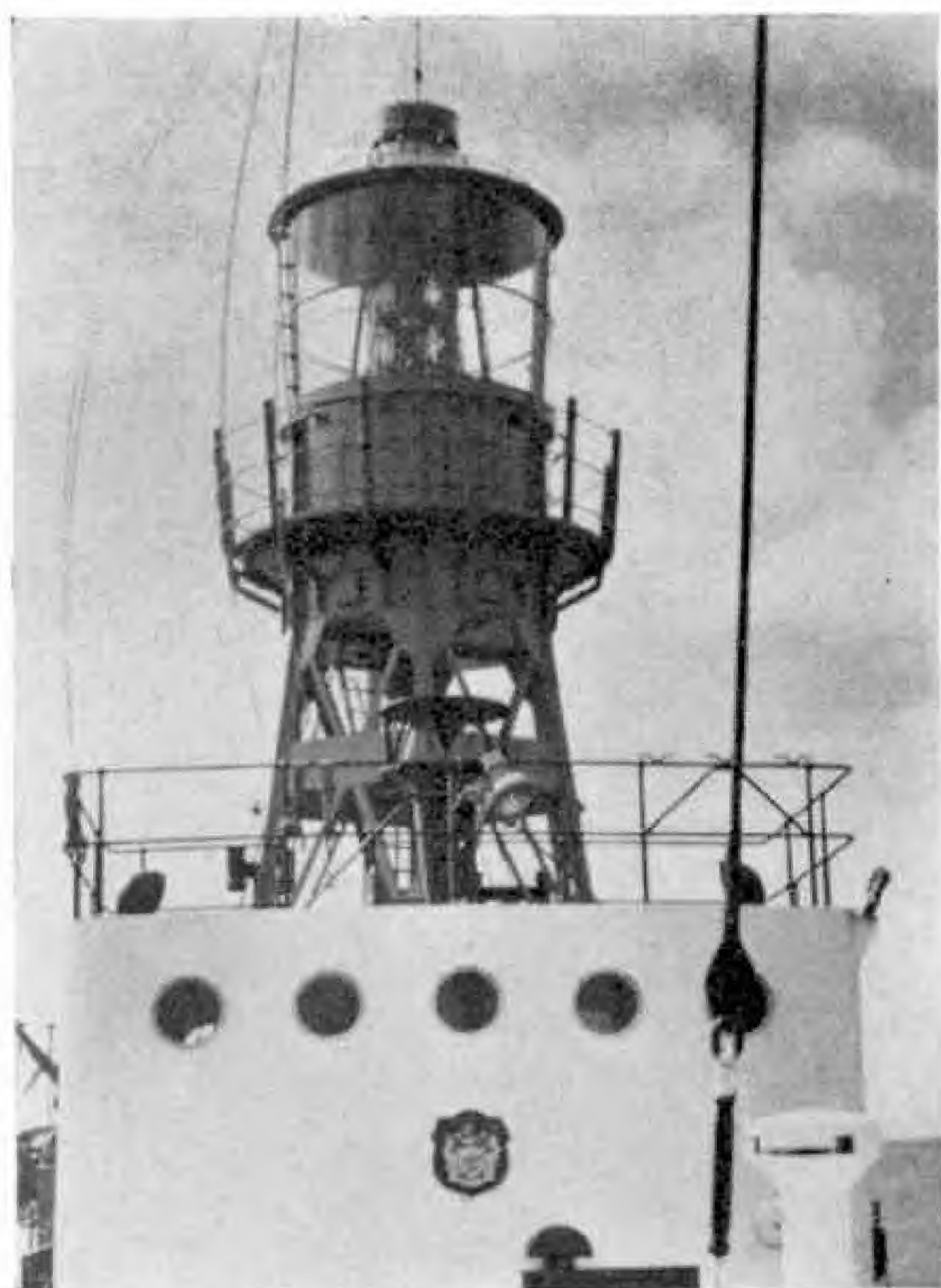
On some of the stations, the watch-keepers take hourly observations of the weather conditions, and the information is transmitted to the Meteorological Office to be included in the shipping forecast. The crew must also spend much of their time painting and cleaning, and generally keeping the light vessel in good order. Off duty, the traditional hobbies of mat making

and producing ships in bottles are giving way to the attractions of radio and television.

Most of the personnel attached to Owers have seen service in either the Royal or Merchant Navy. The crew consists of two Masters, three Lamplighters, three Fog Signal Drivers and three Seamen. Promotion up the ranks in the light vessel service—from Seaman to Master—is dependent upon examinations and length of service. A new entrant must serve a probationary period before being appointed as a regular. Then, after training, the Seaman can qualify as Fog Signal Driver, responsible for running and maintaining all the vessel's machinery. After a further period of service and examinations, the Driver is promoted to Lamplighter. He can then qualify for Master, but he will only be eligible for promotion when he has passed all the examinations and has become the Senior Lamplighter of the whole fleet by virtue of his length of service. The examinations for Master are extensive, covering chart work, signals, radio communications, fire fighting, first-aid and cable work.

Of the eleven personnel attached to Owers, one officer and three ratings are relief ashore, for in this service, not unnaturally, the periods of shore leave are generous to an extent comparable with few other occupations. The Master does four weeks on duty, in charge of the light vessel, followed by four weeks of shore-leave, and the remainder of the crew are on board for four weeks and then ashore for a fortnight.

When I joined Owers, half of the crew were due for relief in four days, and most of them were ready for it. By the end of their

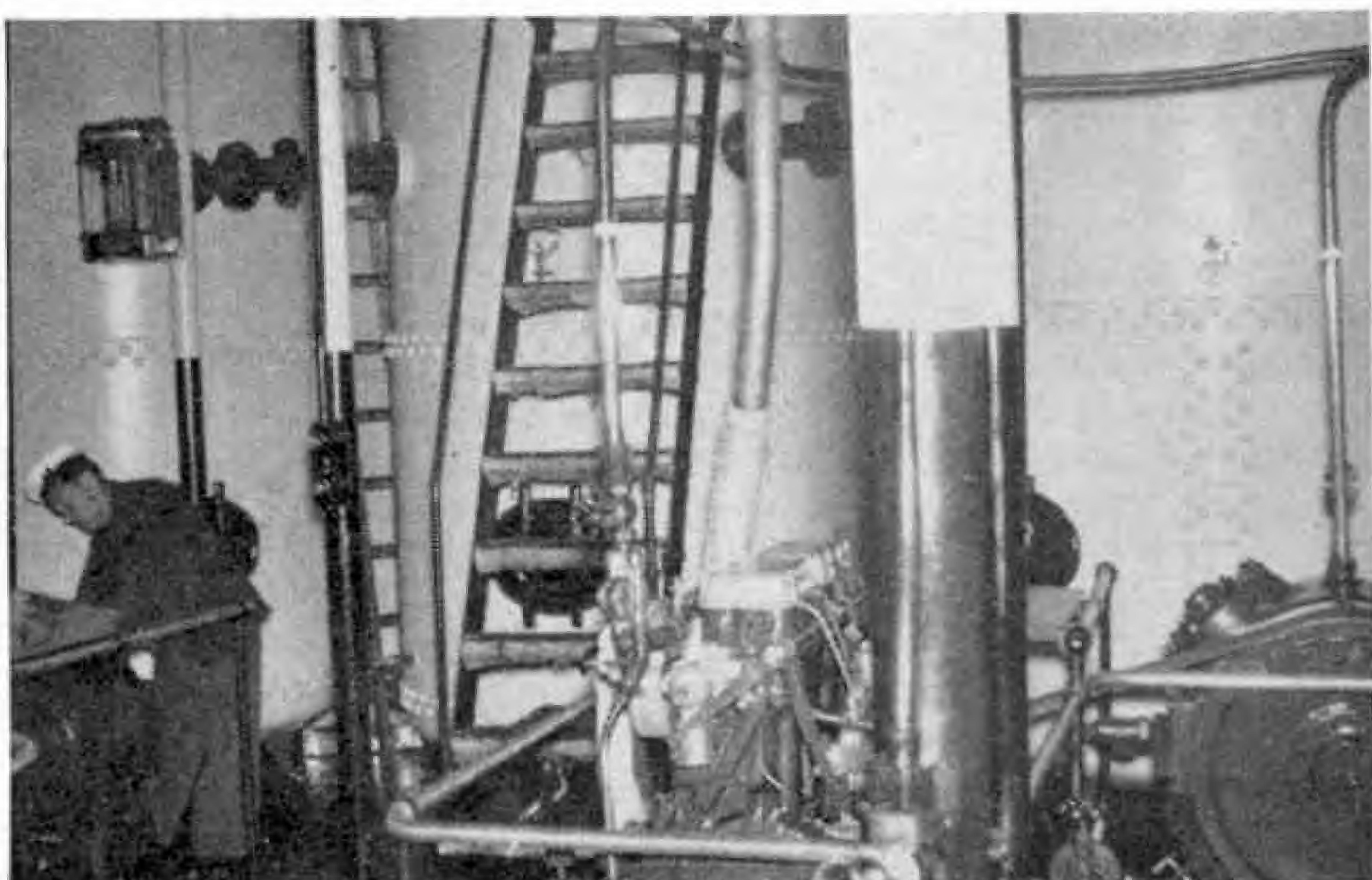


The powerful light comes from six 500-watt pre-focus bulbs and reflectors. It can be seen eleven miles away.

spell of duty their fresh food is usually finished. For their mail and newspapers they have had to rely on the relief tender, which only comes once a fortnight. Occasionally, there may be a fisherman in the vicinity who can be hailed alongside to take the mail ashore.

The statutory public duty of providing and maintaining the lighthouse, lightship and buoyage service of England, Wales and the Channel Islands was entrusted to the Corporation of Trinity House, London, under various Acts and Charters from the time of Queen Elizabeth I, the latest being the Merchant Shipping Act 1894.

The function of Trinity House is to provide a service for the safety of the mariner by reducing the navigational hazards of shipping. The light vessels included in this provision are specially



One of the generating sets and compressors that provide compressed air for the diaphone fog signal. Behind the engine are three of the enormous tanks for storing the compressed air.

designed and built for this service, which they provide by marking danger and maintaining position to guide shipping.

The layout of Owers is typical of an efficient, modern light vessel. Although she has no machinery for moving her through the water, a third of the hull is taken up with engine-room space. There are four electric generating sets supplying the powerful light, and there are two compressors providing compressed air for the diaphone fog signal. The compressed air is stored in three enormous tanks in the engine room, and there are two smaller ones at deck level.

Aft of the engine room is the crew's accommodation, consisting of four twin berth cabins. On the main deck there are washing and recreational facilities, and also a large galley with a coal burning cooking range. Each member of the crew takes his turn as duty cook for the day, but all of them provide and prepare their own food. Before they leave the mainland, they collect provisions sufficient to last them a fortnight. For the remaining two weeks on board, they have to order up fresh supplies, which are brought out to them in the relief tender. Their stocks are also supplemented with fish, which they were catching with remarkable regularity.

The Master's spacious cabin and pantry are right aft. The wireless cabin is situated in his quarters, for only the Master holds a licence to transmit, and he must frequently listen in for messages for him or about ships in difficulties in his area. There is also the twice daily Trinity House test, during which the lighthouses and light vessels within the East Cowes district can communicate with each other. The test is made on a special wave-band, and usually takes the form of lighthearted comments on the weather, leave or any other topic of news interest.

Radio beacons are also fitted to some of the Trinity House light vessels as an additional aid to navigation. An identification signal is transmitted, and ships with direction finders can pick it up and then obtain a bearing on the beacon. Some light vessels also provide a calibration service on which other ships can calibrate their direction-finding apparatus.

When the wind is of force 7 or over, the Master goes on to Bad Weather Watch. He informs the local radio station that he is on continuous listening and can be contacted immediately in case of an emergency message. When there is fog about, the powerful diaphone fog signal is switched on. This warning is so shattering that the whole ship vibrates under the mighty roar—yet the crew are so used to it that they can sleep quite peacefully with or without the noise. But during fog, the watch-keepers are increased from two to three, working four hours on duty and four hours off, so the opportunity for sleep is reduced. Two of the watch-keepers stay on deck, and one is below in the engine room.

The light is also switched on during fog, mainly for the safety of the light vessel. Normally it goes on 15 minutes before sunset. All the lights in the English Channel have their own characteristics so that they can be easily identified. Owers light is shown on the chart as Gp.F1(3) 20 sec. 11 M., which means that she shows a group of three flashes every twenty seconds that can be seen for eleven miles. The lights themselves do not flash. They are focused beams, and the whole lighting unit is rotated by a small electric motor. The whole lens system is mounted on a pendulum apparatus so as to preserve the horizontal beam when the ship rolls.

That was the last I saw of Owers as I returned to land.



The Master using the radio-telephone equipment to relay a message to his District Superintendent via Niton Radio, on the Isle of Wight.

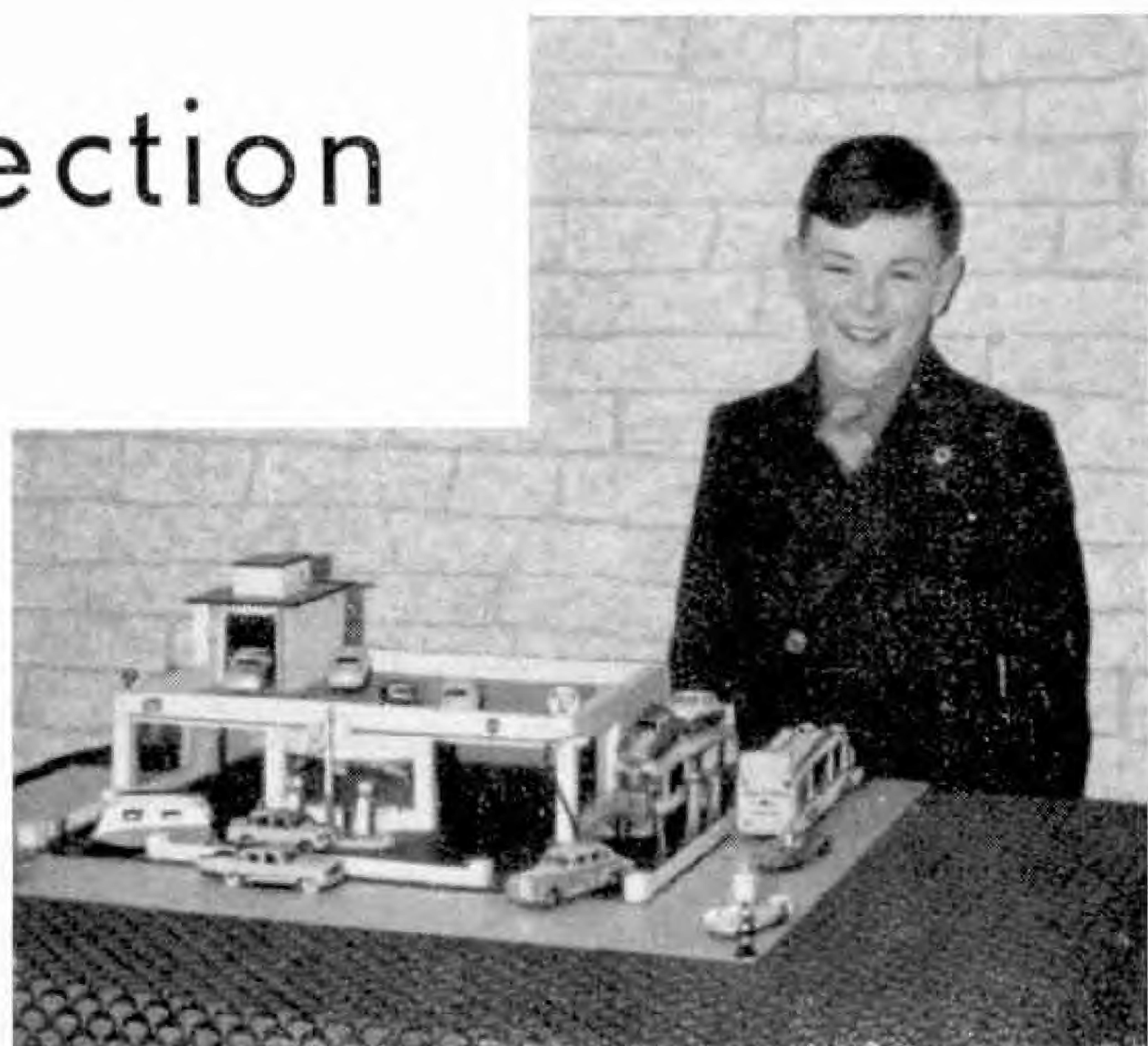
MECCANO MAGAZINE

Junior Section

IN the picture on the right Terry Adams is standing proudly alongside his garage, a busy place where there are cars parked on the roof as well as others having their tanks filled and otherwise serviced on the ground. There is plenty of variety among the Dinky Toys, which include a Caravan and the Car Carrier and Trailer. The owner of the garage is certainly justified in smiling.

The addition of a garage makes all the difference to playing with Dinky Toys when these include a good proportion of cars, lorries and other road vehicles. Terry is fortunate in that respect, for his father made the garage for him, to a simple but effective design, and presented it to him on his 8th birthday.

From play with miniatures we turn to interest in real things, in this instance trains, in our lower illustration. This shows a train spotter at work, and I am glad to see that he is doing it quite safely, having



chosen a vantage point that is not only good for seeing trains but has the further advantage that he cannot get in the way of railwaymen working. There is nothing worse than a locomotive spotter who makes himself a nuisance in or near stations and goods yards.

That cannot be charged against Raymond Flintoft, the spotter seen in the picture. He lives in Acomb York, and in the picture is seen standing on the steps of a

footbridge near York Station. The locomotive is 45662, the name of which is *Kempenfelt*. There are of course many fine locomotives to be seen from his chosen spotting place, for it is on the East Coast Route, the home of the famous Gresley Pacifics.

Raymond is not only a real railway fan, but is also a Meccano, Hornby Train and Dinky Toys enthusiast. He shares his delight in all these pursuits with his father, who particularly delights equally in all matters concerning railways.



Easy Model-Building

"Spanner's" Special Section for Juniors

A Simple Helicopter

From the parts in Outfit No. 0 you can build the attractive model Helicopter shown in Fig. 1, and it is a very simple model to construct.

To start building the model, first take two $5\frac{1}{2}$ " Strips and to one end of each of them bolt an Angle Bracket and a Fishplate, the same bolt holding both parts in each case. The two Strips are now joined by bolting the free lugs of the Angle Brackets together by means of the Bolt marked 1 in the illustration. It will be noticed that the Fishplates are placed on the outside of the $5\frac{1}{2}$ " Strips.

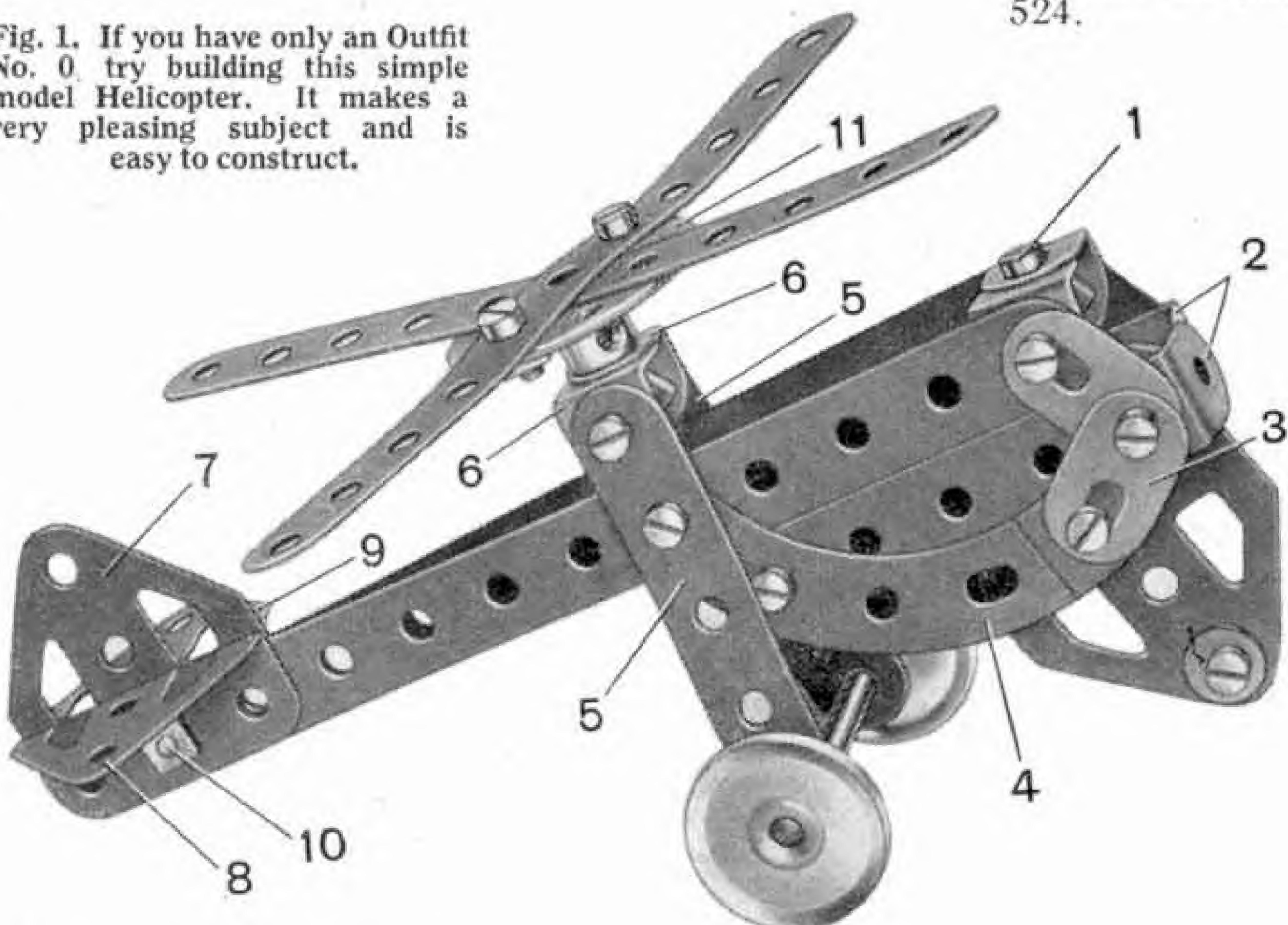
Now bolt a $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip (marked 2 in the illustration) to each Fishplate and with the same bolt fix a second Fishplate 3 to the first one. The next thing is to bolt one end of a stepped Curved Strip 4 to each Fishplate 3 and then bolt the other end of the Curved Strip to one of the $5\frac{1}{2}$ " Strips, together with a $2\frac{1}{2}$ " Strip 5. Bolt the rear lugs of the Double Angle Strips 2 together and bolt an Angle Bracket 6 to the upper end of each Strip 5, the bolt passing through the elongated holes of the Fishplate.

The Helicopter wheels are fixed on a 2" Rod that is pushed through the lower end holes of the $2\frac{1}{2}$ " Strips 5.

To form the tail planes and rudder place a Flat Trunnion 7 between the $5\frac{1}{2}$ " Strips and Trunnions 8 and 9 on the outside of the Strips and bolt them all together by means of the bolt marked 10.

The Helicopter rotor blades consist of two $5\frac{1}{2}$ " Strips and they are bolted to a Bush Wheel 11. Fix the Bush Wheel on a $\frac{3}{8}$ " Bolt pushed through the two Angle Brackets 6 and your model Helicopter is now complete.

A list of the parts required to build the Helicopter appears on page 524.



Dragline Excavator

The model Dragline Excavator shown in Figs. 2 and 3 can be built from parts in Outfit No. 3. First a base is built from two $5\frac{1}{2}$ " Strips 1, to each of which a Trunnion 2 is bolted. A $2\frac{1}{2}$ " Strip and a $2\frac{1}{2}$ " Curved Stepped Strip are also bolted to this Trunnion. Two $2\frac{1}{2}$ " Semi-Circular Plates are bolted one above the other to the flange of the Trunnion 2. The Semi-Circular Plates carry the superstructure.

The base of the cab is a $5\frac{1}{2} \times 2\frac{1}{2}$ " Flanged Plate. A Road Wheel is fixed on one end of a $1\frac{1}{2}$ " Rod 3 and the Rod is then passed through the fifth hole in the centre row of holes in the Flanged Plate and through the centre holes of two 8-hole Wheel Discs underneath the Plate. Then the Rod is passed through holes in the two Semi-

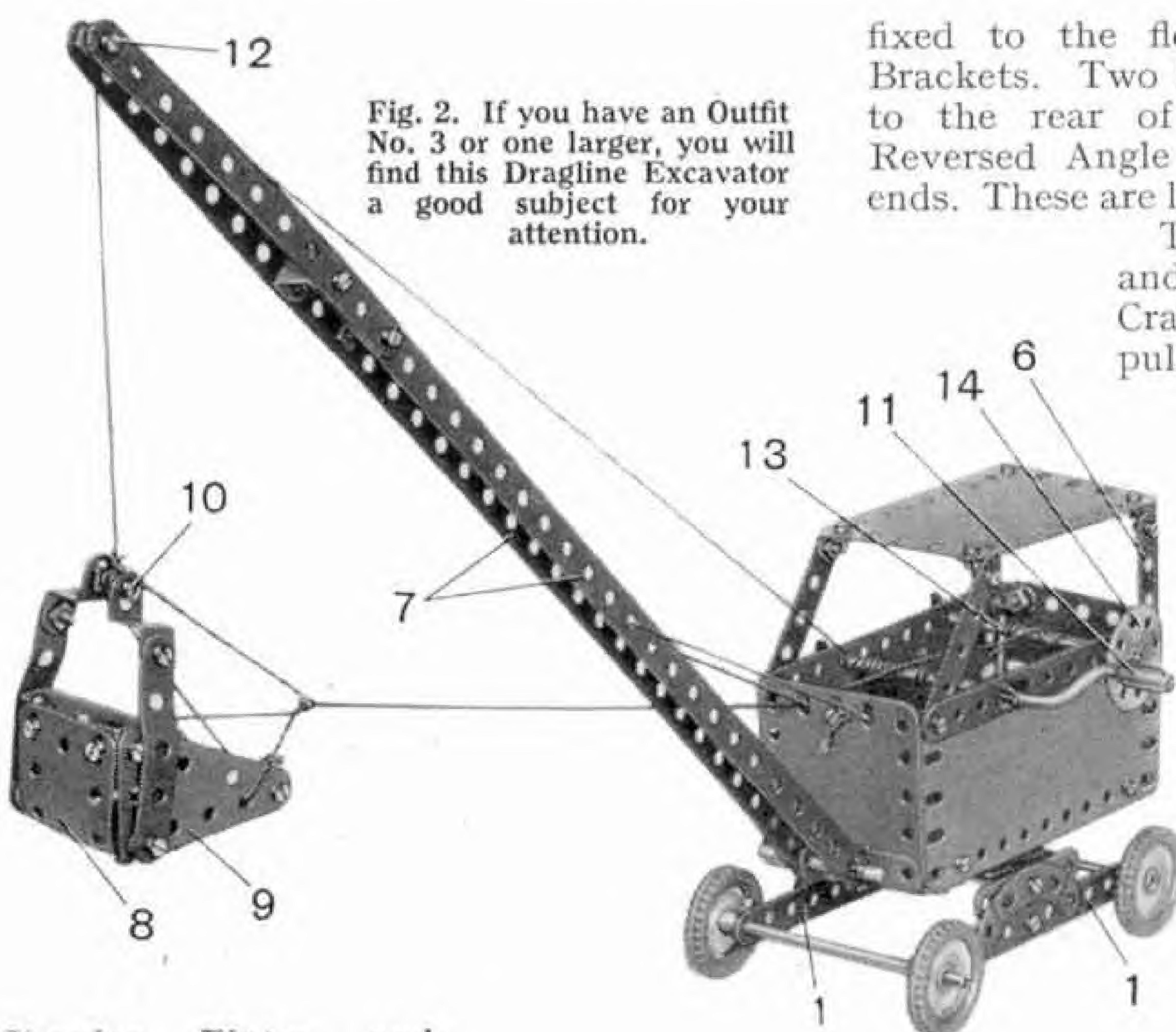


Fig. 2. If you have an Outfit No. 3 or one larger, you will find this Dragline Excavator a good subject for your attention.

Circular Plates and fitted with a Washer and a Cord Anchoring Spring.

The sides of the cab consist of $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates, and two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Plates form the front and rear. These Plates are secured to the sides at the front by means of a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip, and at the rear by Angle Brackets. The sides are edged by two $5\frac{1}{2}''$ Strips 4.

The roof consists of two $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates, which are fixed to struts consisting of $2\frac{1}{2}''$ Strips 5 at the front and $2''$ Strips 6 at the rear. The front corners of the Plates are attached to the Strips 5 by Angle Brackets, while at the rear the attachment is made by bolting the Strips 6 to the lugs of a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip fixed to the Plates.

The jib consists of two $12\frac{1}{2}''$ Strips 7 extended by two $5\frac{1}{2}''$ Strips, overlapped three holes. The lower ends of the $12\frac{1}{2}''$ Strips are pivoted on a $1\frac{1}{2}''$ Rod held in place by two Spring Clips in a Double Bracket bolted to the Flanged Plate.

The drag bucket is made from two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates 8 and 9 overlapped two holes to form the bottom and back. The sides are two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Plates,

fixed to the floor and back by Angle Brackets. Two $2\frac{1}{2}''$ Strips are lock-nutted to the rear of the bucket, and carry Reversed Angle Brackets at their upper ends. These are lock-nutted on a $\frac{3}{4}''$ Bolt 10.

The Drag Bucket is raised and lowered by turning a Crank Handle 11, and is pulled forward in a scooping motion by turning handwheel 14. This is an 8-hole Bush Wheel fixed on a $3\frac{1}{2}''$ Rod 13 held in place in the cab sides by a Spring Clip on its other end.

A length of Cord is tied to a Crank Handle 11 journaled in the sides of the cab, then passed over a $\frac{1}{2}''$ Bolt 12 and the jib head and finally tied to the Bolt 10 on the bucket. Another length of Cord is tied

to the Rod 13, passed through a hole in the $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate at the front of the cab and then tied as shown to each side of the bucket.

This model reproduces the movements of the real machine with great reality, although the model itself is quite simple to construct. Those of you who have not seen a giant dragline excavator in operation will gain some idea of how the bucket is pulled forward and fills itself with earth. The digging edge of an actual bucket is provided with strong steel teeth.

(Continued on page 524)

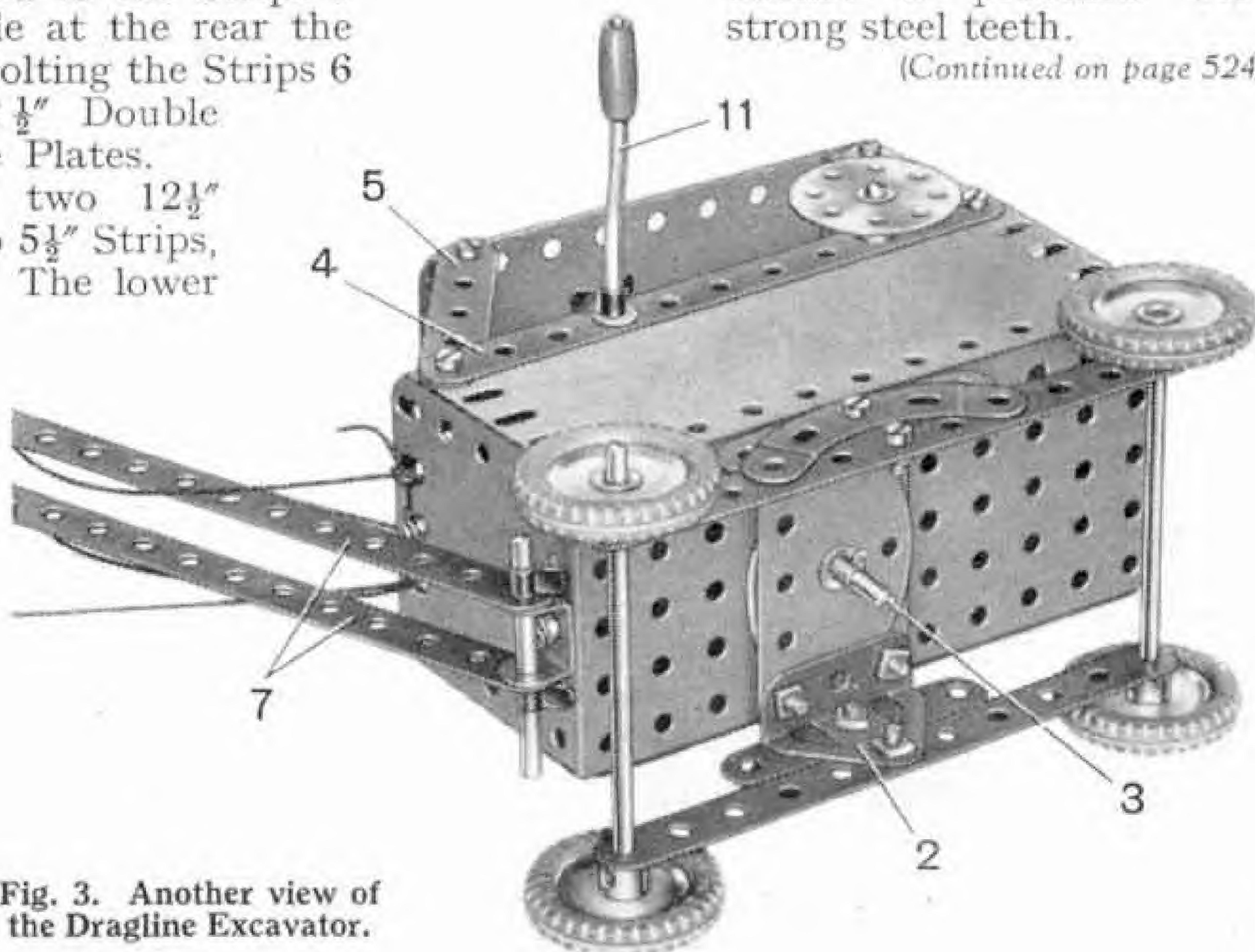


Fig. 3. Another view of the Dragline Excavator.



DINKY TOYS

NEWS

By THE TOYMAN

A NEW Dinky Supertoy, which has already caused a big stir in the ranks of collectors, has appeared in the shops this month and there is every indication that this fine new item is going to be one of the most sought for and popular of all the many fine Dinky Supertoys already available. It is a splendid model of the Corporal, complete with Missile Erector Vehicle and Launching Platform, and it is listed as Dinky Supertoys No. 666.

This superb new toy is shown in the illustration at the foot of this page, and is an accurately modelled miniature of Britain's famous guided weapon. Further, it is a working model that has lots of play value, for the rocket itself can be loaded on to its launching platform and fired in a realistic manner. This can be repeated time after time and the model is therefore a most attractive and exciting one to play with. There is already a big demand for it, so I advise you to go along to your dealer and make sure of getting yours.

While you are there you should also take the opportunity to examine the latest addition to the range of Dinky Toys. This is a neat and carefully detailed miniature of the Volkswagen Karmann Ghia, which is



R. Vietro, London E.C.1, photographed with some of his Dinky Toys and his Hornby Dublo Railway.

catalogued under Dinky Toys No. 187. It is shown in the illustration at the top of page 499, and is also seen in the centre of the attractive road layout reproduced at the foot of page 500.

The VW Karmann



Here is a line drawing of the new Dinky Supertoys Missile Erector Vehicle, complete with Corporal Missile. It is listed under No. 666. The rocket can be loaded and fired time and time again.



This is the new Karmann Ghia, a most attractive addition to the Dinky Toys range. It is catalogued under No. 187.

Ghia coupé combines the sturdy chassis of the standard VW Saloon and attractive coach work of Ghia of Turin. It is a sleek and business-like rear engined model, with beautifully curved bonnet and wings that merge into the doors. Other features are the well-wrapped-round bumpers, the sloping roof and the large rear window. The 4-cylinder 1192 c.c. engine of this car is well-known for its reliability and comparative ease of maintenance.

Incidentally, in the road layout picture you can see also another instance of the splendid effect created by the new Dinky Toys Hoarding introduced last month. One or two of these Hoardings will make very useful additions to your collection.

Many British enthusiasts visiting France on holiday come back home with treasured examples of Dinky Toys made at the Meccano Factory at Bobigny, Paris. For various reasons it has not been possible previously for Dinky Toys collectors to obtain these models in Great Britain, and I am sure that the news that some of the French models are now on sale here will be very well received. Arrangements have also been made to produce some of the French types at our Works in Liverpool, although they will only be available in a limited range.

Already on sale is a fine model of a Simca Glazier's Lorry, No. 579, and a pipe-line transporter, No. 893 in the Dinky Supertoys range, that is known as the Unic Sahara Tractor. This is an articulated vehicle with detachable trailer modelled on a French tractor that carries such materials as pipes for the Sahara oilfield pipelines. The lengths of piping carried on this fine model can be fitted together in realistic fashion. The Simca Glazier's

Lorry is specially designed for transporting large sheets of glass, mirrors, etc., and the model is complete with samples.

And now for a few words about some of the other pictures I am including this month. First I wish to draw your attention to the one at the foot of this page. "Danger! Quarrying in progress!" Real? Or is it just a Dinky Toys layout? I know it is hard to tell the difference from a quick glance at the picture, for in this David Sharp of Spotland, Rochdale, has achieved a very realistic effect by using a Blaw Knox Bulldozer and a Muir-Hill Dumper Truck in a miniature quarry.



Danger! Quarrying in progress! A realistic outdoor scene in which David Sharp, Rochdale, has made excellent use of the Blaw Knox Bulldozer and the Muir-Hill Dumper Truck.



An attractive Dinky Toys town layout designed and used by C. Gurtner, Paris.

taken in choosing the positions of the vehicles adds to the realism. I am sure that many other Dinky Toys enthusiasts will want to follow David's example, if they have not already done so. But do take care to see that you clean every trace of soil from your models after you have finished playing with them. Otherwise the enamel may be damaged and spoil the attractiveness of your collection.

At the top of this page is a picture of a Continental street scene layout, which is very reminiscent of Paris.

This is perhaps not surprising, for it is the work of Christian Gurtner, who lives there. I wonder

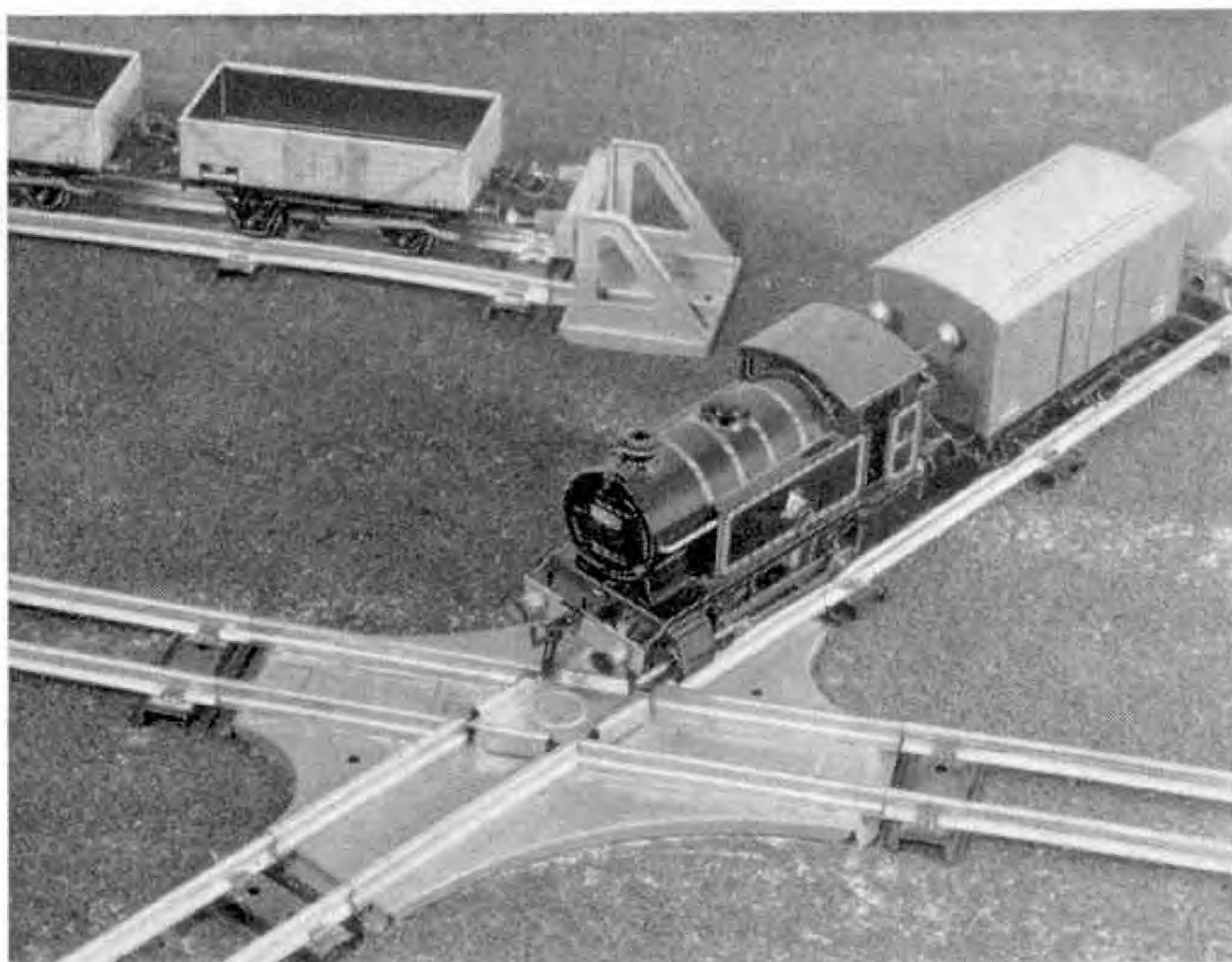
how many of you have spotted that many of the vehicles on the roads are French? I am sure that the more observant of you noticed at once the kerb-side filling station. These features add up to a layout with an appearance rather different from that which we generally see. But notice also how well the

(Continued on page 524)

The central feature of this interesting corner of a town layout is the new Karmann Ghia car. Note also the realism provided by the Road Hoarding.



"Tommy
Dodd"
writes
about:



A Railway and Some Track Ideas

THIS month we visit, in one of our pictures, another Gauge 0 railway on which Hornby Clockwork Locomotives run. This is the system of Mr. V. H. Cutts, of St. Albans, who has the distinction of being quite an early member of the Hornby Railway Company (H.R.C. No. 624), but the railway had its beginnings even before the foundation in 1928 of the Hornby Railway Company.

The veteran Hornby 4-4-0 Locomotive shown in the upper illustration on the next page was part of the original stock and has been in use ever since.

The type of engine shown has long since vanished from the Hornby range, but its running to-day speaks well for the lasting qualities and reliability that are characteristic of all Hornby Clockwork Locomotives. Such performances as this should be an encouragement to present-day Hornby engine drivers to look after their locomotives with as much care as has obviously been given to the maintenance of this early 4-4-0.

No doubt you would like to know something about the railway on which the engine runs. It is a permanent outdoor

Above is a Hornby No. 40 Tank Locomotive on an Acute-Angle Crossing, a useful and workmanlike track component. Behind the engine is a No. 50 Goods Van.

system, so that it cannot be regarded as a Hornby railway in the ordinary sense, as the track, stations and other fixed items are necessarily built of weather-resisting materials. As you know, Hornby railway equipment is designed primarily for indoor use, although it can be employed successfully out of doors in suitable conditions, as we have seen in various recent issues of the *M.M.*

The actual plan of the layout is of interest in various respects. The track is roughly speaking

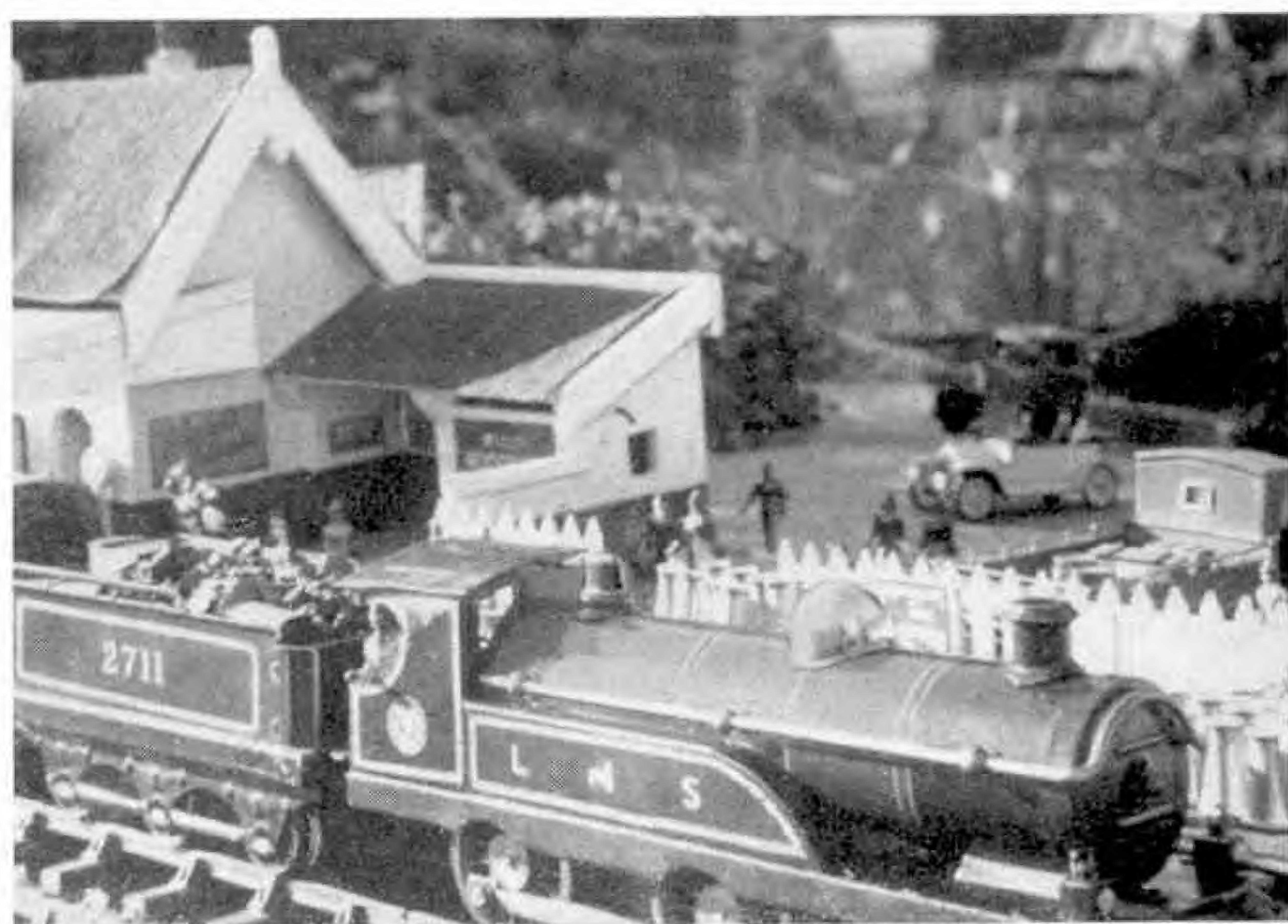
pistol-shaped, the "barrel" section being formed of a terminal station called *Hilary* and its approaches, with the "butt" consisting of a there-and-back loop on which is situated the station *Rummies Hill* that appears in our illustration. From this return loop a branch is thrown off to *Bobthorpe*, where there is a temporary station at present, but an extension beyond this is projected to serve the city of *Dinchester*, which at the moment exists in imagination only. This branch runs off the loop line in such a manner that through running between it and the original terminus is possible. In addition to trains

A veteran Hornby 4-4-0 Clockwork Locomotive at "Rummies Hill" on the layout of Mr. V. H. Cutts, St. Albans.

providing this service there are others that are run from *Hilary* to *Rummies Hill* and back again.

The terminus is therefore quite a traffic centre and an interesting feature of its layout is that a turntable at the inner end beyond the platform not only provides access to the engine sidings, but also connects the platform line with a run-round loop road and therefore acts as a traverser, that is it is used to transfer an engine from one track to the next and therefore it saves the use of points for this purpose at one end of the loop. This is an arrangement that can be carried out with the Hornby No. 2 Turntable on 2 ft. radius layouts, as I expect some of you have already discovered, the normal arrangement of a 2 ft. radius Point and an A2 Curved Rail together being employed at the opposite end of the loop.

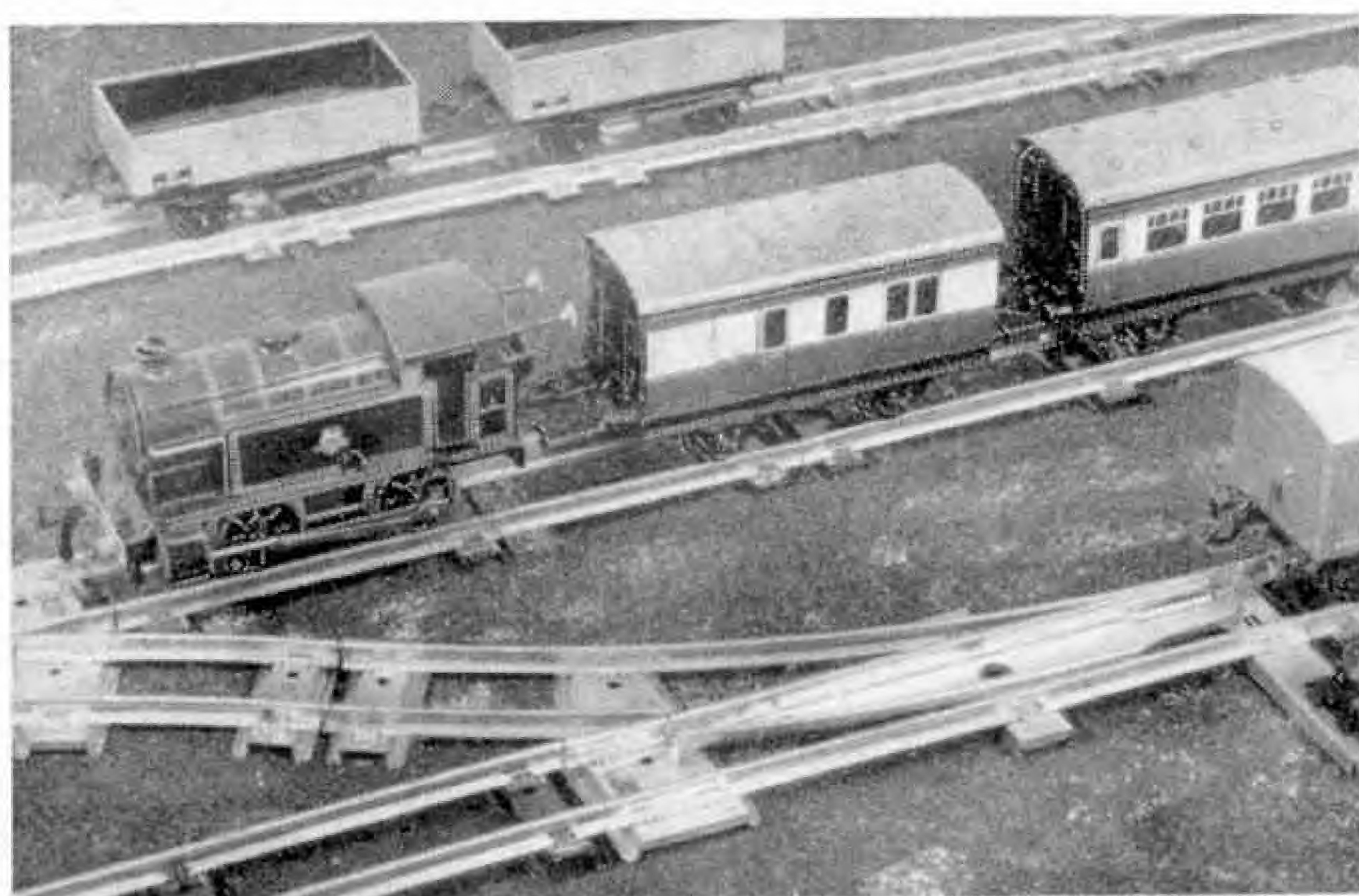
The loop can be extended to form a short siding or spur beyond the Point. Then two Points of the same "hand" are needed, forming in effect a crossover in a similar manner to the scheme in our third illustration. In this way trains or engines can be



passed readily from one track to the other through the Points, and a good rule for the operator to observe is not to work one Point lever without operating the other, so that the switch rails are always in agreement. Otherwise a derailment or collision might be caused and such mishaps are things to be avoided.

When we think about Points we normally consider crossings too, that is track crossings where two routes intersect. The Hornby System includes two types, the Acute-Angle Crossing and the Right-Angle Crossing. Each type is made in two forms, to suit 1 ft. radius and 2 ft. radius layouts respectively. An Acute-Angle Crossing in a 2 ft. radius layout is shown in the illustration at the head of this article.

Crossings can be used in conjunction with Points in certain layout situations where there is plenty of space, but most owners think of them in connection with what are often called "Figure 8" layouts. These can be exciting, even if only one train is in use.



Two Right-Hand Points form a crossover on this Hornby layout. The No. 40 Tank is working a train of No. 51 corridor-type stock.

Of General Interest



This station building was a private house before the line it served was built. Photograph by J. A. Fleming.

THE building in the picture above has had an interesting history. Until 1885 it was a private house, occupied by the manager of a mustard firm, but then a railway was built from West Drayton to Staines. To save money the engineer concerned proposed that the house should be used as the station building at Staines. So it was bought. The lower floor was adapted for railway purposes, and the staircase to the private rooms on the upper floor now rises in a most unusual way from the booking hall. The platform is reached through what was the back door of the building when it was a private house.

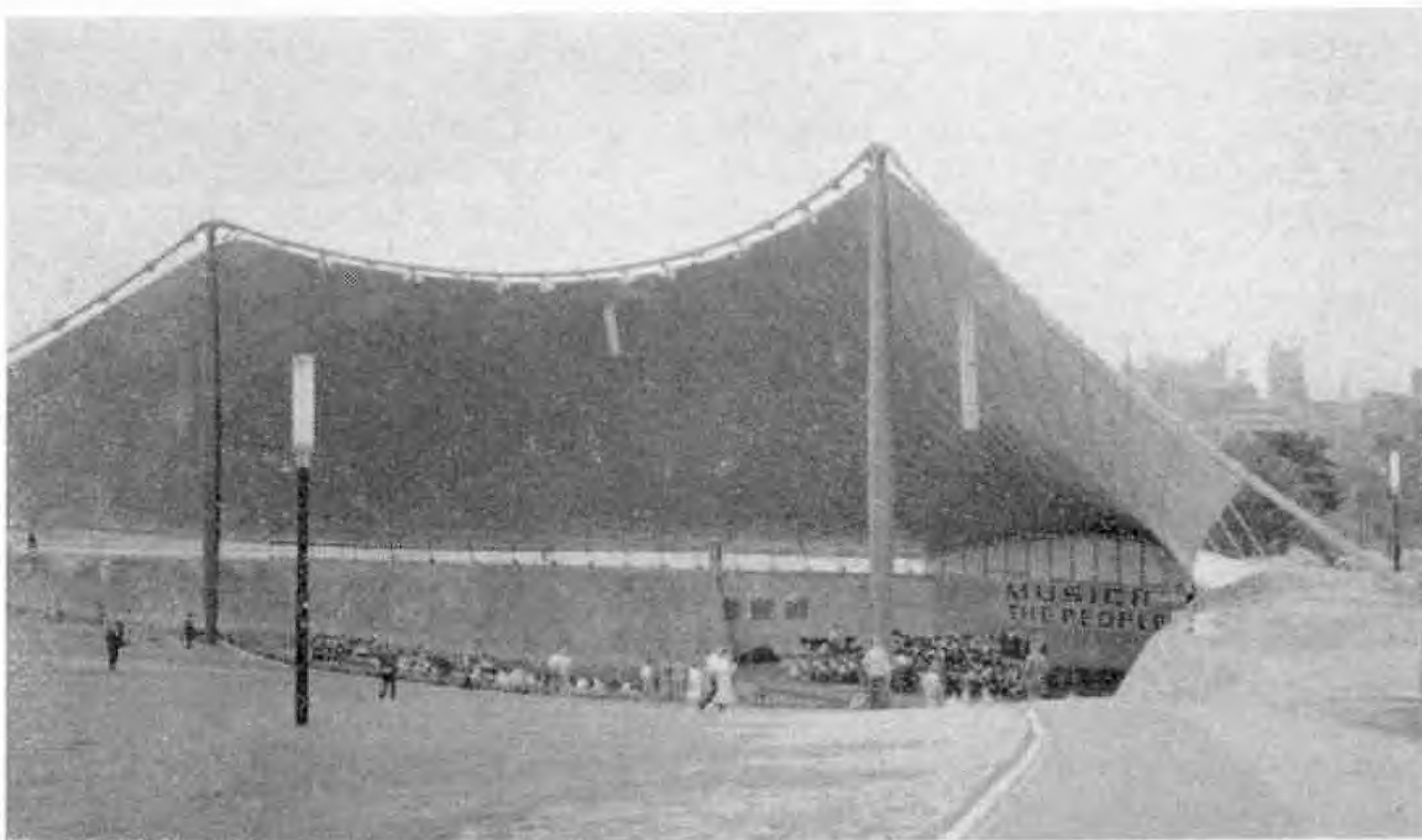
The Staines and West Drayton railway ceased to exist as a separate concern in 1900, and since then has been part of the Great

Western Railway and the Western Region of British Railways.

For our other topic this month we go to Melbourne, Victoria, where the remarkable Sydney Myer Music Bowl, shown in the lower picture on this page was completed recently at a

cost of about £200,000. It will be seen that the roof is not of a usual building material, and many people were worried lest it should collapse in a strong wind. It is elastic, however, and so is safe; if it were rigid it would billow up with the first storm and snap its mooring lines.

Seven steel hawsers, $2\frac{1}{2}$ in. in diameter and weighing $7\frac{1}{2}$ tons, run from the two masts, which are 70 ft. high, and provide the necessary support for the cover. Under this there is a stage 110 ft. wide, with seating for 2,000 people, but another 20,000 or more can enjoy concerts.



An unusual structure. It is the Sydney Myer Music Bowl, in Melbourne. Photograph by J. Ketelhohn.

New Maps for Railway Engineers

By
Geoffrey Reynolds

BRITISH RAILWAYS are now engaged in a vast programme of modernisation. In the course of this, which of course also involves increasing use of up-to-date diesel locomotives and the extension of electrification on a large scale, the tracks, marshalling yards and the huge networks of lines outside main line stations must be overhauled. Before plans for this part of the work can be laid, maps showing the present layouts exactly must be studied. Many of the maps used until recently dated from the last century and most urgently needed revision.

The best way to begin this essential work is to have a series of photographs taken with a camera mounted in the fuselage of an aircraft so that it points vertically downwards. The shutter is automatically controlled to make exposures at regular intervals, and the plane flies to and fro on parallel courses over the area being mapped.

Each photograph overlaps the adjacent frame by 60 per cent. and each strip of photographs overlaps the previous run by half this amount. In this way, at least two views are taken of all sections of the ground.

A mosaic of the entire area, a jigsaw puzzle with rectangular pieces, is made up from contact prints. Although the aircraft, under the combined influence of its engines and the wind, may travel crabwise relative to the ground, this is corrected in the camera mounting and does not show on the finished prints.

The mosaic is often easier to interpret than a largely symbolic map and for many purposes the engineer will use it in



A Percival "Prince" flies over an area that is to be surveyed. The lines drawn from the aircraft to the ground show how each photograph in the series is taken, and it is easy to see the overlaps referred to in the article. Photographs illustrating this article are reproduced by courtesy of Hunting Aerosurveys Ltd.

preference to the detailed plan. But for railway use line maps are plotted from the contact prints.

Many different types of aircraft have been used for this work including Oxfords, D.H. Rapides and Bristol Freighters. In the war Spitfires and Mosquitos were used for aerial photography of enemy-held territory on account of their speed. The Percival Prince was specially designed for aerial cartography. Its completely perspex nose provides good all-round visibility for pilot and photographer.

Cameras for this work have lenses of 5 to 6 inch focal length and usually take a photograph 7 to 9 inch square. They are provided with interchangeable lenses. A wide angle lens gives maximum accentuation of relief, but there is a fall-off in illumination at the corners of the negative, while the narrow angle lens produces better mosaics, closer to the true plan, but is not so good for contour work. The normal lens represents a compromise.

The definition achieved by modern cameras is truly remarkable. An object



The above photograph, taken at Selsdon Road, Croydon, was the basis of the map seen at the foot of the page, and comparison of them helps to show how the map is prepared with the aid of a stereographic plotting machine.

only 3 inches wide is clearly visible in a negative taken from 2,000 feet! Photographs are usually made through yellow filters to reduce atmospheric haze.

The film is liable to distortion with temperature and humidity changes in spite of great care in handling and storage. Accordingly, glass plate transparencies are often made from the film negative immediately after processing to ensure undistorted permanence.

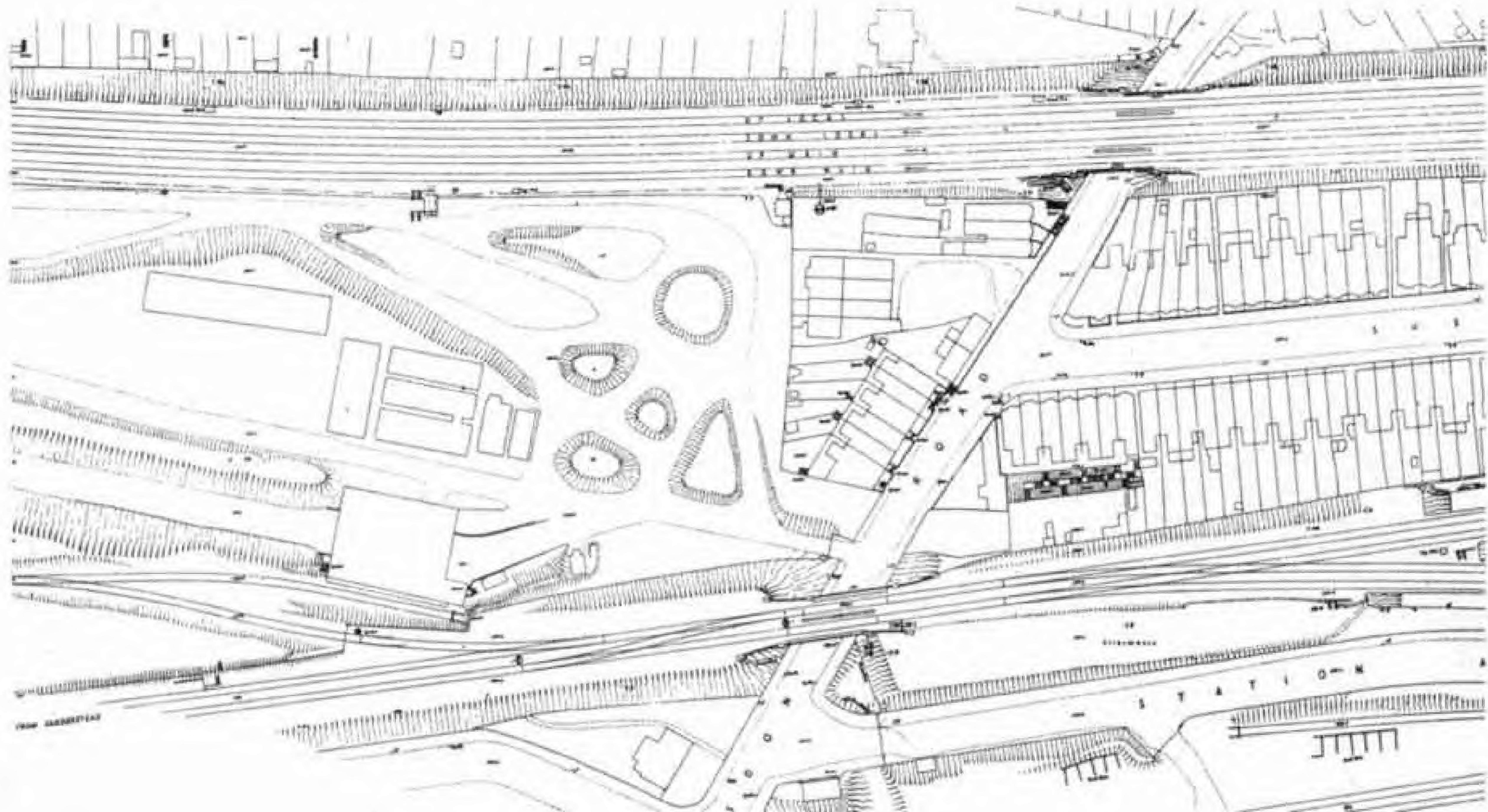
The accuracy of the final maps is governed by the height of the aircraft and its careful navigation. Any deviation of the machine from level flight causes a distortion in the picture. Provided there is little land relief, this can be satisfactorily corrected during the plotting process in the

laboratory, but the fault is better avoided when possible. While, as might be expected, flying lower generally improves the photograph there is a lower limit to the height from which the camera may be used; otherwise, the aircraft's movement during the exposure time will show on the negative.

Aerial photography can give rise to unexpected snags. The roofs or gutter lines of buildings will show rather than the ground

lines required for large scale plans. Trees and vegetation obscure whatever is beneath them and which would be observed in a ground survey. The bonnet of a car protruding from its garage has given rise to misinterpretation and appeared on a map as an extension of the garage (although this was spotted and corrected before final printing). Hydrants and manholes are frequently invisible in the prints, while objects of less interest to the map user, but of greater contrast, such as "Keep left" signs, appear in conspicuous detail.

As an example of this kind of work, detailed maps of $3\frac{1}{2}$ miles of track and sidings between East Croydon and Purley were made from aerial photography some years ago. The programme from the start

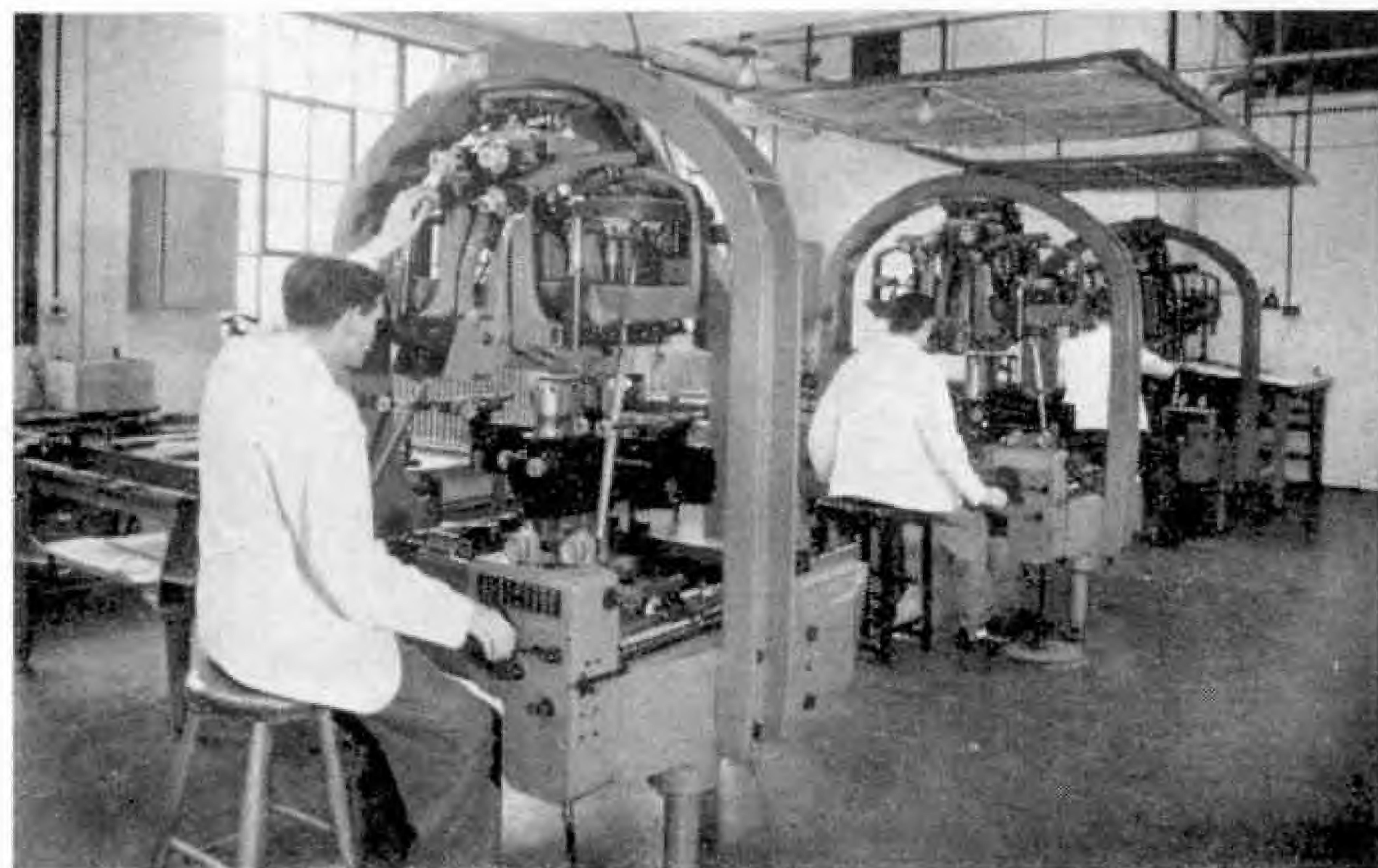


to the supply of the final maps took 27 weeks, which is to be compared with an estimated time of 18 months to two years for a ground survey. In addition, the aerial work avoided the delays and disruption to services which would inevitably have accompanied the presence of surveyors and their instruments on the track.

The first step was a walk over the site by the photographic expert to assess the particular assignment. Items which were unlikely to appear distinctly on the aerial photographs, such as the precise location of points, switches and crossings, were painted white for clarity. Some particulars, such as the location of bridge piers, invisible from the air, needed to be marked on the ground in some suitable manner so that their position could be traced on to the final map.

In the next stage, the photography of the area from the air, a De Havilland Rapide was used, flying at 100 miles per hour at a height of 2,200 feet. The exposure was 1/300th of a second at F/5.6.

Prints of each negative were then taken



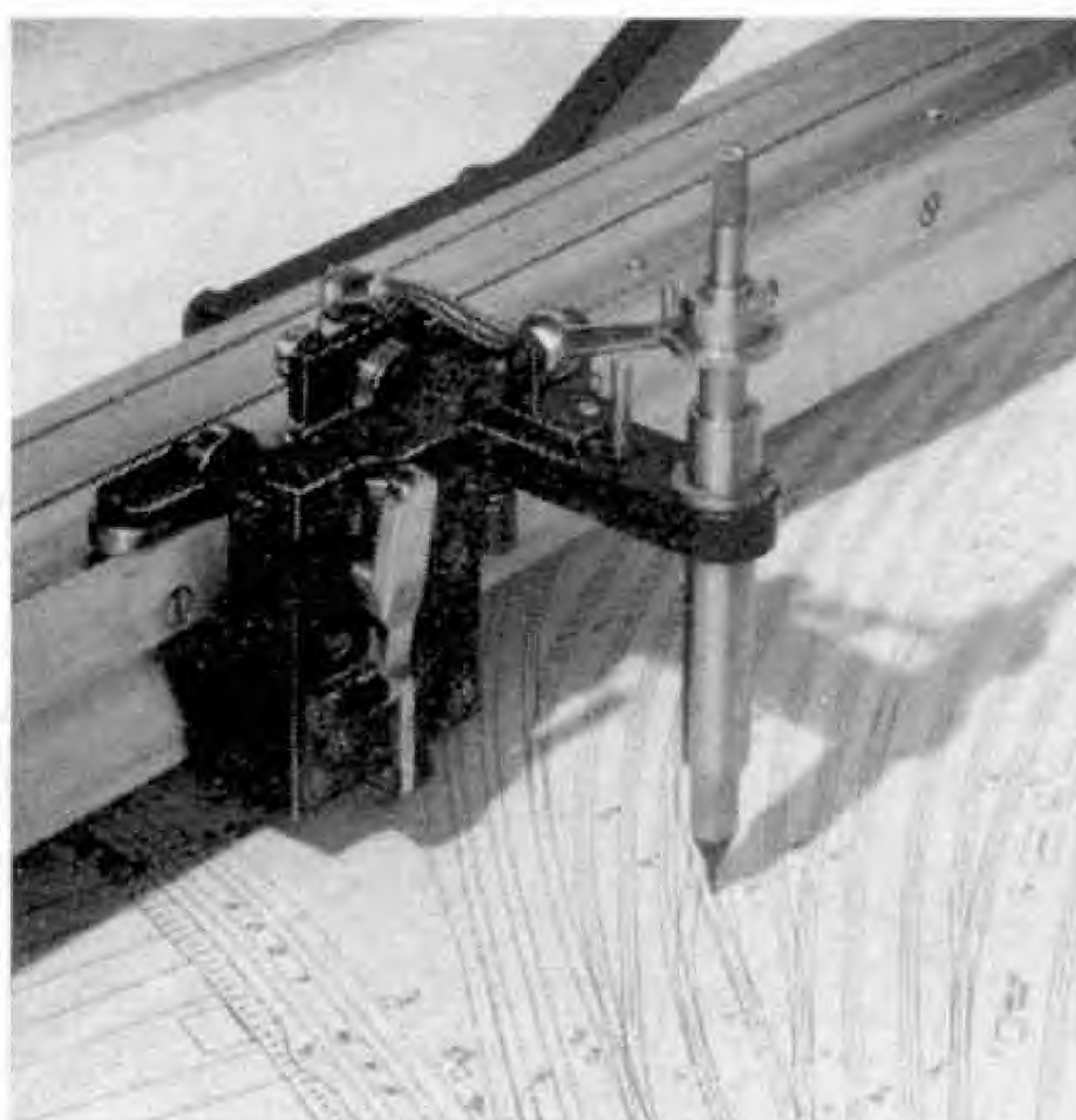
The Wild A.5 Stereo-plotting machine plays a vital part in preparing accurate maps from aerial photographs.

to the site by the plotter, and any doubtful photographic objects were then identified and other plotting difficulties settled by visual comparison. In order to give the photographs a scale, a number of ground control measurements were made by normal survey methods in nearby public streets and not on railway property so that no dislocation of rail traffic was incurred.

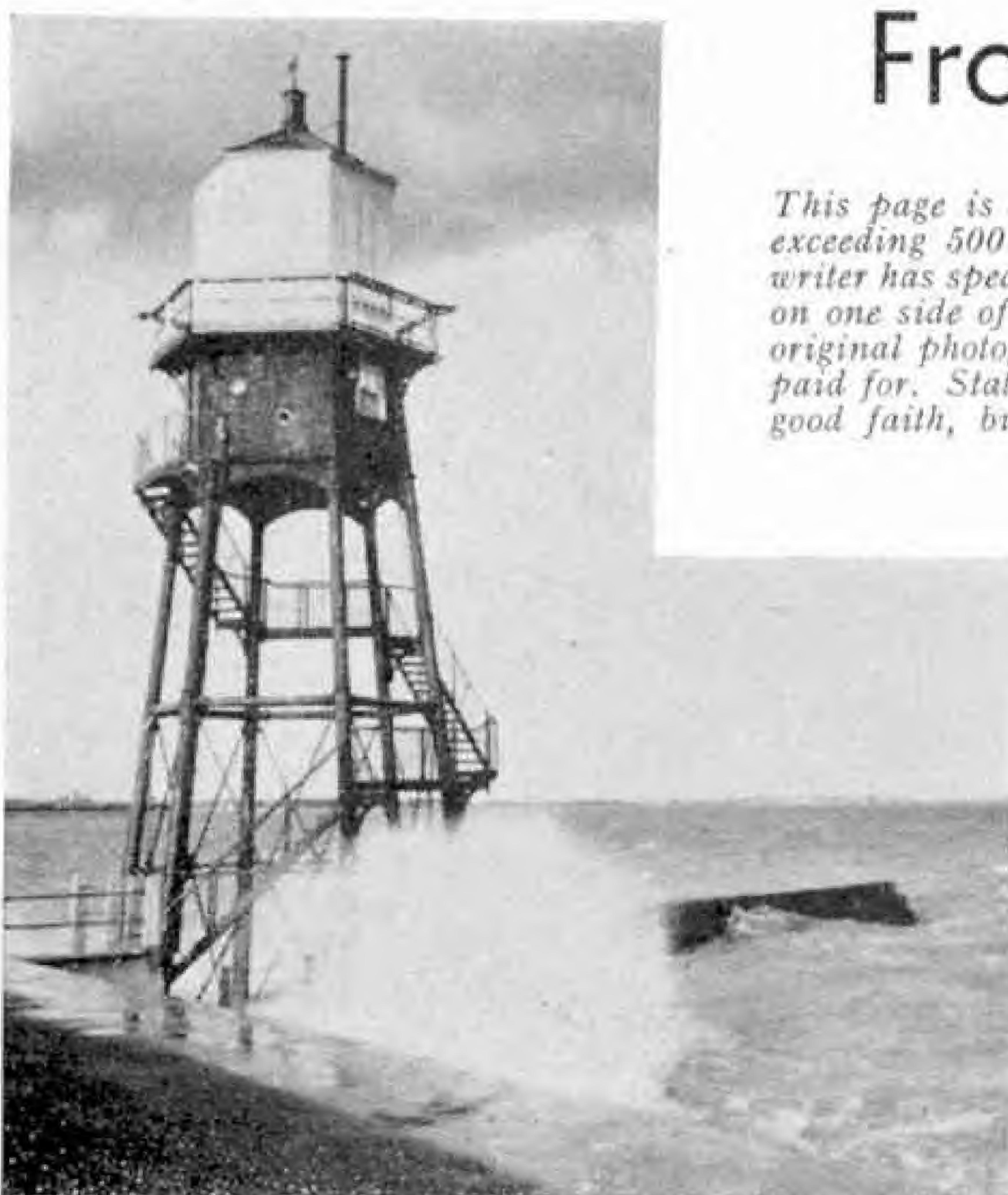
The cartographers were now ready to produce the large scale plan. A stereographic plotting machine is used for this work. It comprises two cameras to project consecutive photographs in pairs on to a special drawing table. The projecting lenses can be adjusted to correct any distortion due to aircraft not flying level at the time of the exposure. The operator, looking through binoculars incorporated in the instrument, can only see one picture with each eye, giving the impression of a three-dimensional view of a small area of terrain photographed in exaggerated relief.

He also sees a white dot in his field of view and controls are provided whereby he can steer this manually along any surface feature of the plan detail or trace out contours with it. At the same time a pencil, coupled to this control, draws appropriate lines on the map. An accuracy to within 6 to 9 inches of the true position of the detail on a 1 in 500 scale plan, well within normal plan accuracy limits, can be achieved with this device.

When the whole area of the plan has been drawn up with the stereo-plotter, the map is inked in and extra details, legend, inscriptions, road names, etc. added. A final field check is carried out on the site.



The pencil point of the stereo-plotting machine at work on a railway plan.



This was a lighthouse until the first World War and is now the den of a Rover Crew. Photograph by H. L. Hall, Dovercourt.

Now a Rover Crew Den

The lighthouse seen in the accompanying photograph is one situated just off Dovercourt front in Essex. Its light guided shipping into the neighbouring port of Harwich from 1862, when it was built, until the 1914-18 war, when it went out of service.

Harwich Corporation had often wondered what to do with the lighthouse, and recently solved the problem by offering it to the 4th Dovercourt Sea Rover Crew as a "den" for a small annual rental, on condition that they become responsible for the painting and upkeep. The Crew eagerly agreed to the suggestion. Access to the iron staircase can be gained at all times although, as can be seen from the photograph, when a heavy sea is running a dash has to be made between waves breaking on the front.

In summer the den provides a fine place in which to change for swimming, and it is comfortable in winter.

The 4th Dovercourt Sea Rover Crew must be unique in having such a den.

H. L. HALL (Dovercourt).

A Fine Memorial

When at Dartmouth recently I was interested in the Newcomen Memorial in the Embankment Gardens and took

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

the accompanying photograph of it. The inscription reads—"This memorial is erected to the memory of THOMAS NEWCOMEN inventor of the atmospheric steam engine. Born in Dartmouth A.D. 1663. Died A.D. 1729. The first to conceive the idea of working a piston by steam."

Below this on a bronze plate is a fine representation of his invention with the caption *Newcomen Engine 1712*.

An ironmonger by trade Newcomen lived and experimented in a house that, with many others, was demolished in 1864 to make a new exit from the town, appropriately named Newcomen Road. Portions of the old house were used in 1866 in the building of Newcomen Lodge near the bottom of Ridge Hill.

C. E. WRAYFORD (Bovey Tracey).



A splendid memorial to a steam engine pioneer, is in the Embankment Gardens at Dartmouth. Photograph by C. E. Wrayford, Bovey Tracey.

Among the Model-Builders

By "Spanner"

A Novel Use for Meccano

The upper illustration on this page shows one of my valued correspondents, Mr. Alan B. Partridge, Northampton, engaged in binding his *Meccano Magazines* with the aid of a useful stitching frame he made up from Meccano parts. Mr. Partridge likes doing things for himself and he says that the stitching frame has proved very successful.

Winding Drum Unit for Cranes

The mechanism shown in Fig. 1 is a self-contained arrangement for operating two winding drums in model cranes. One of the drums can be used to control the luffing of the jib and the other to control raising and lowering of the load. The mechanism is a complete unit ready for installing in the cab of the crane and is actuated by an E15R Electric Motor.

The base of this mechanism, which of course will be the floor of the cab in an actual model, is suitably constructed from Angle



Mr. Alan B. Partridge, Northampton, and his binding apparatus. See note on this page.

Girders and Flat Plates. Two $3\frac{1}{2}$ " Angle Girders 1 and 2 are bolted across the floor, and to them are bolted the two side-plates 3 and 4 that provide the bearings for the mechanism shafts. These are joined together by a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate at each end.

The drive is taken from a $\frac{1}{2}$ " Pinion mounted on the driving shaft of the E15R Motor. This Pinion drives a 57-Tooth Gear 5 mounted on a Rod that carries a $\frac{1}{2}$ " Pinion 6 inside the side-plates.

Two Rods 7 and 8 are mounted in the side-plates 3 and 4 as shown, and each carries between the side-plates a loose 57-tooth Gear 14 or 15, a fixed

1" Pulley 9 fitted with a Rubber Ring, two fixed Bush Wheels placed boss to boss to form a winding drum, and a Collar, in one of the screwed holes of which a $\frac{3}{8}$ " Bolt 10 is fixed.

Outside the side-plate 3 a

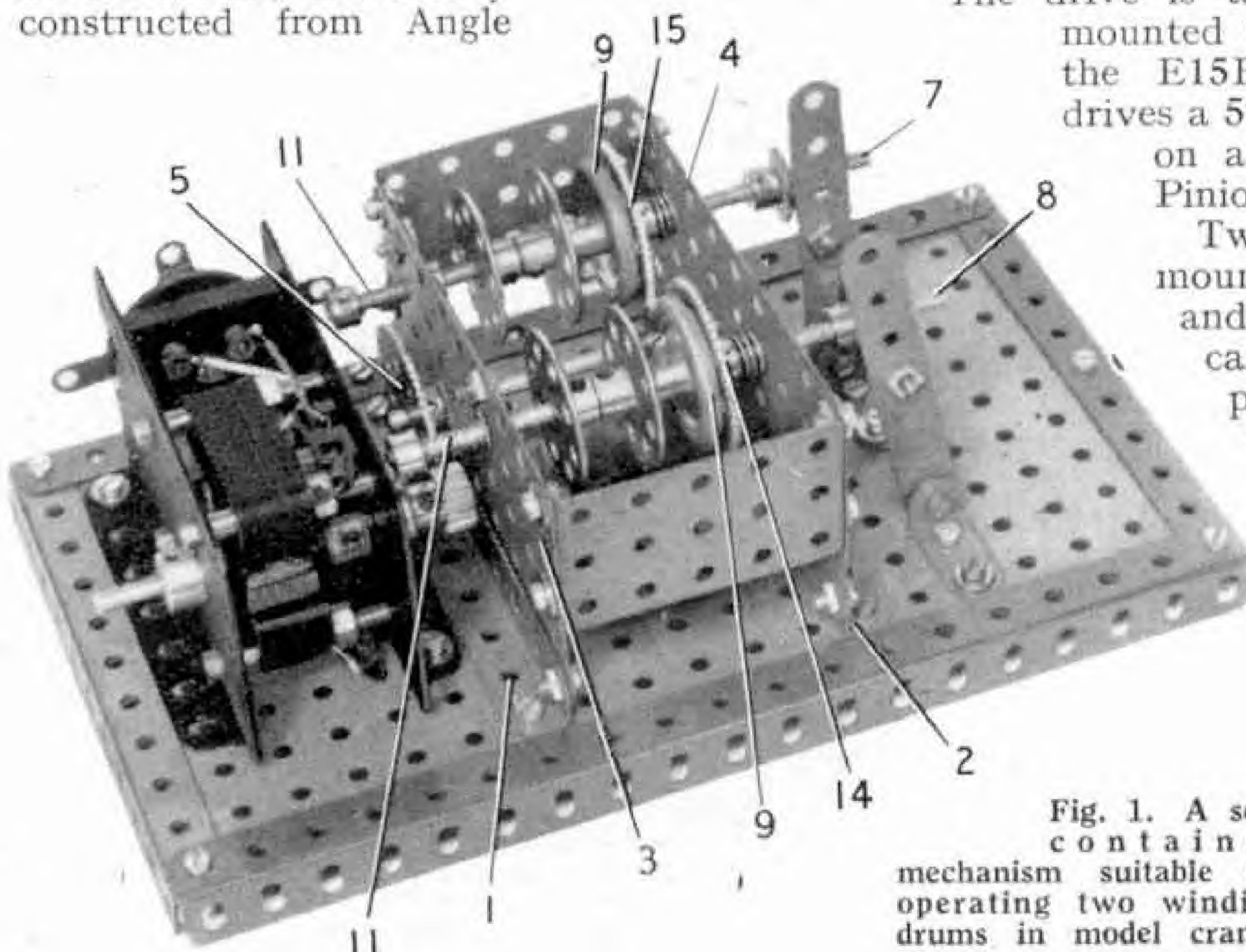


Fig. 1. A self-contained mechanism suitable for operating two winding drums in model cranes.

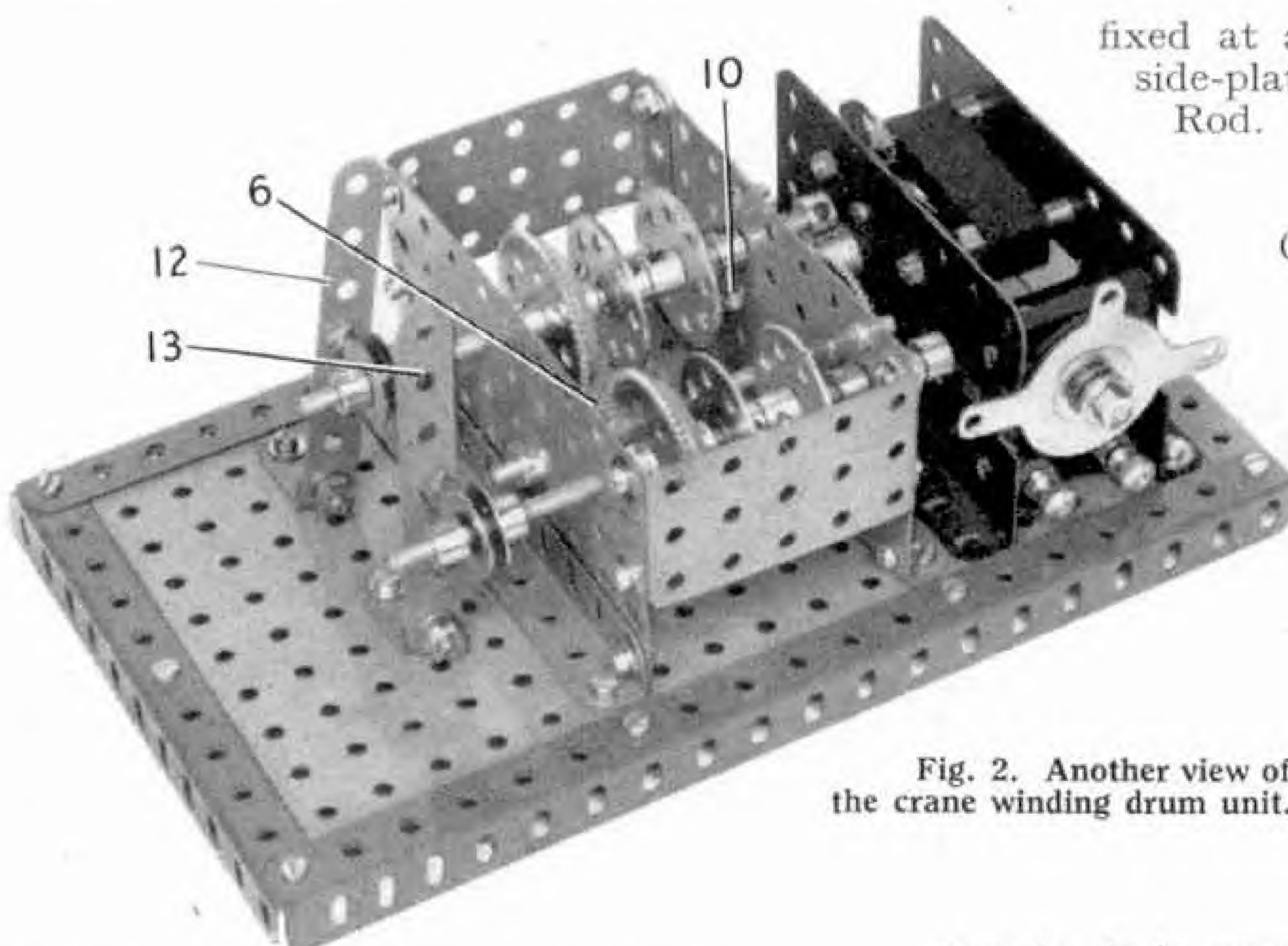


Fig. 2. Another view of the crane winding drum unit.

Compression Spring 11 is fitted between a Washer and a Collar on each of the Rods 7 and 8.

Now two levers 12 and 13 are lock-nutted in place and a Threaded Pin is fixed by a nut in a hole in each of the levers so that it protrudes between two $\frac{3}{4}$ " Washers that are held in place by two Collars on each of the Rods 7 and 8 as shown.

If the levers are positioned as shown in the illustrations, when the Motor is in motion the winding drums will remain stationary, the 57-tooth Gears 14 and 15, which are in constant mesh with the $\frac{1}{2}$ " Pinion 6, rotating idly on their shafts. If lever 13 is pulled outward however the Rubber Ring fitted to the fixed 1" Pulley 9 will be forced against its 57-tooth Gear and a friction drive will be transmitted to the Rod 7 and its winding drum will be rotated.

When the lever is released the action of the Spring 11 withdraws the 1" Pulley from the 57-tooth Gear and the winding drum stops rotating. The second lever 12 controlling Rod 8 operates similarly.

To prevent the Rods 7 and 8 rotating under the weight of the load or jib when not engaged, a brake formed by the Bolt 10 contacting a bolt

fixed at a suitable point on the side-plate 3, is provided for each Rod.

Roller Bearing

Cranes and machines such as excavators are among the most popular subjects for Meccano models, probably because they can be made to work so much like the real machines. Models of this type usually have a large and heavy swivelling superstructure, and if the model is to work smoothly and be really pleasant to

operate, it is necessary to see that this is supported on a really satisfactory bearing.

The complete Ball Thrust Bearing, part No. 168, is an ideal bearing unit for small and medium sized cranes, but for very large models an extremely strong built-up bearing is required, such as that shown in Fig. 3. This uses two Flanged Rings for the bearing surfaces. One of the Flanged Rings is bolted to the tower or stationary part of the model, and the other is fixed to the lower part of the cab or revolving superstructure. The rollers are $\frac{3}{4}$ " Flanged Wheels, and they are carried on a special framework or "spider", which is free to pivot on the centre shaft of the bearing.

The spider is made by bolting eight $\frac{3}{4}$ " Strips radially to a Face Plate 1, and each Strip is

(Continued on page 512)

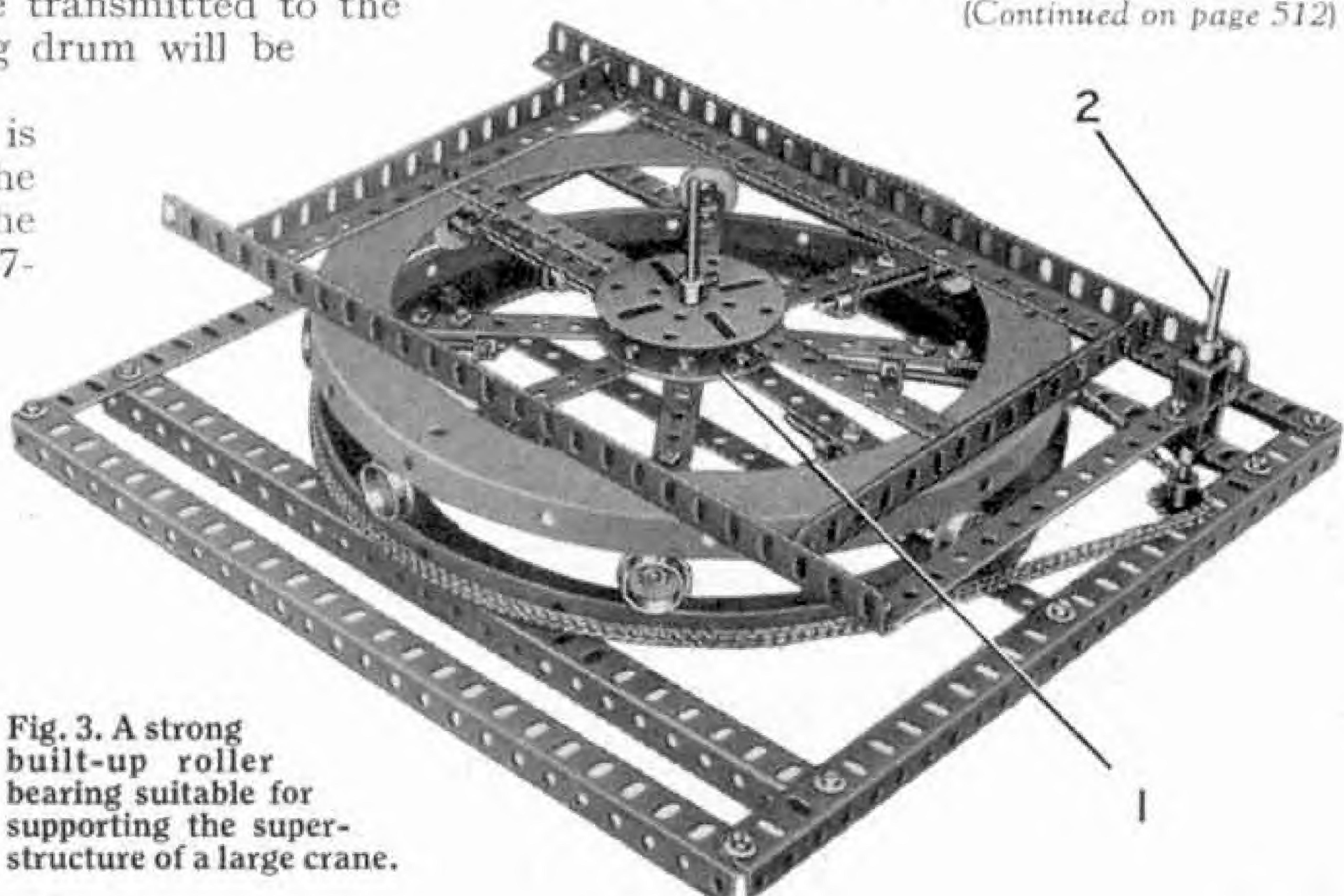


Fig. 3. A strong built-up roller bearing suitable for supporting the superstructure of a large crane.

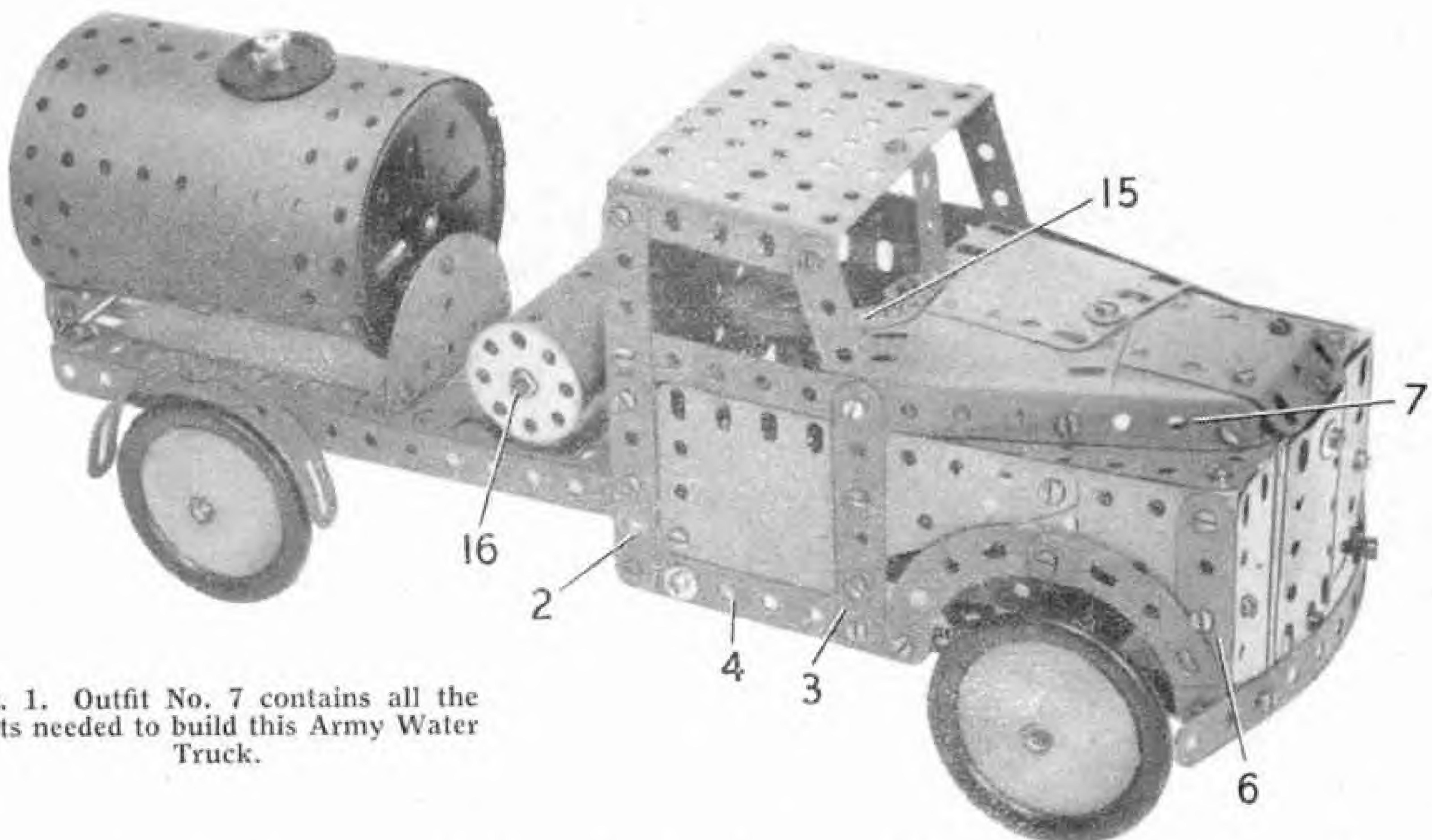


Fig. 1. Outfit No. 7 contains all the parts needed to build this Army Water Truck.

A New Model for Outfit No. 7

Army Water Truck

THE Army Water Truck shown in Figs. 1, 2 and 3, makes an attractive subject for the model-builder with at least the contents of a No. 7 Outfit at his disposal.

The chassis is made up of two $12\frac{1}{2}$ " Angle Girders connected together by means of a $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate 1 and two $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates. Each side of the cab consists of a $2\frac{1}{2}''$ Strip 2 and a 3" Strip 3, bolted to the flanges of the $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate.

A $3\frac{1}{2}''$ Strip 4 is bolted to the bottom holes of the $2\frac{1}{2}''$ and 3" Strip on each side as shown, and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate is bolted to the 3" and $3\frac{1}{2}''$ Strips. Strips 2 and 3 are extended by further $2\frac{1}{2}''$ Strips and these in turn are bolted to a $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate that forms the roof of the cab.

The back of the cab consists of four $3\frac{1}{2}''$ Strips bolted to a $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. The two inner $3\frac{1}{2}''$ Strips are bolted to a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 5 at their tops. A 2" Pulley, which represents the spare wheel, is attached to the $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate by means of a $\frac{1}{2}$ " Bolt.

Two Stepped Curved Strips are bolted together end to end and are then attached to the end hole of the $3\frac{1}{2}''$ Strip 4. These form the front mudguards, and they are in turn bolted to a $2\frac{1}{2}''$ Strip 6 at their front

ends. Two $1\frac{1}{2}'' \times 2\frac{1}{2}''$ Triangular Flexible Plates joined together are bolted to the $2\frac{1}{2}''$ Strip 6. A $5\frac{1}{2}''$ Strip 7 is extended by a $1\frac{1}{2}''$ Strip, that in turn is bolted to the upper $2\frac{1}{2}''$ Strip that supports the cab roof.

The top of the bonnet consists of two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates, two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plates and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate. The edges of the Flexible Plates are bent so that they can be bolted to a $5\frac{1}{2}''$ Strip 7 at each side. At the front the bonnet top is attached to a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate 8 by means of an Obtuse Angle Bracket. The $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate is in turn bolted to two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates 9 and 10 by means of a $\frac{1}{2}$ " Bolt but is spaced from the Plate 8 by three Washers on each Bolt. The $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates are connected by Angle Brackets to the $2\frac{1}{2}''$ Strips 6. The front bumper is a $5\frac{1}{2}''$ Strip slightly curved and attached to the ends of the $2\frac{1}{2}''$ Strips 6 by means of Obtuse Angle Brackets. A $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip forms the roof support in the middle of the windscreens.

Two Trunnions that are bolted to the front ends of the $12\frac{1}{2}$ " Angle Girders are joined together by means of a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip and on the outer face of this a $2\frac{1}{2}''$ Strip 11 is bolted. Two Double Brackets are arranged on the $2\frac{1}{2}''$ Strip 11,

and a $1\frac{1}{2}$ " Strip and a $3\frac{1}{2}$ " Strip 12 respectively are lock-nutted to each end of it. The Double Brackets form the bearings for two $1\frac{1}{2}$ " Rods on which the front Road Wheels are mounted. The $1\frac{1}{2}$ " Strip and the $3\frac{1}{2}$ " Strip are lock-nutted at their front ends to a $2\frac{1}{2}$ " Strip. In the third hole of the $3\frac{1}{2}$ " Strip 12 another $3\frac{1}{2}$ " Strip 13 is lock-nutted and the other end of Strip 13 is also lock-nutted to a $1\frac{1}{2}$ " Strip that is bolted tightly to a Crank 14. A $4\frac{1}{2}$ " Rod that forms the steering column passes through a hole in the Angle Girder and is held in position at the top by a $1\frac{1}{2}$ " Strip 15 bolted to the bonnet of the Water Truck. The lower end of the steering is fixed in the boss of the Crank 14.

A Cylinder is fixed to

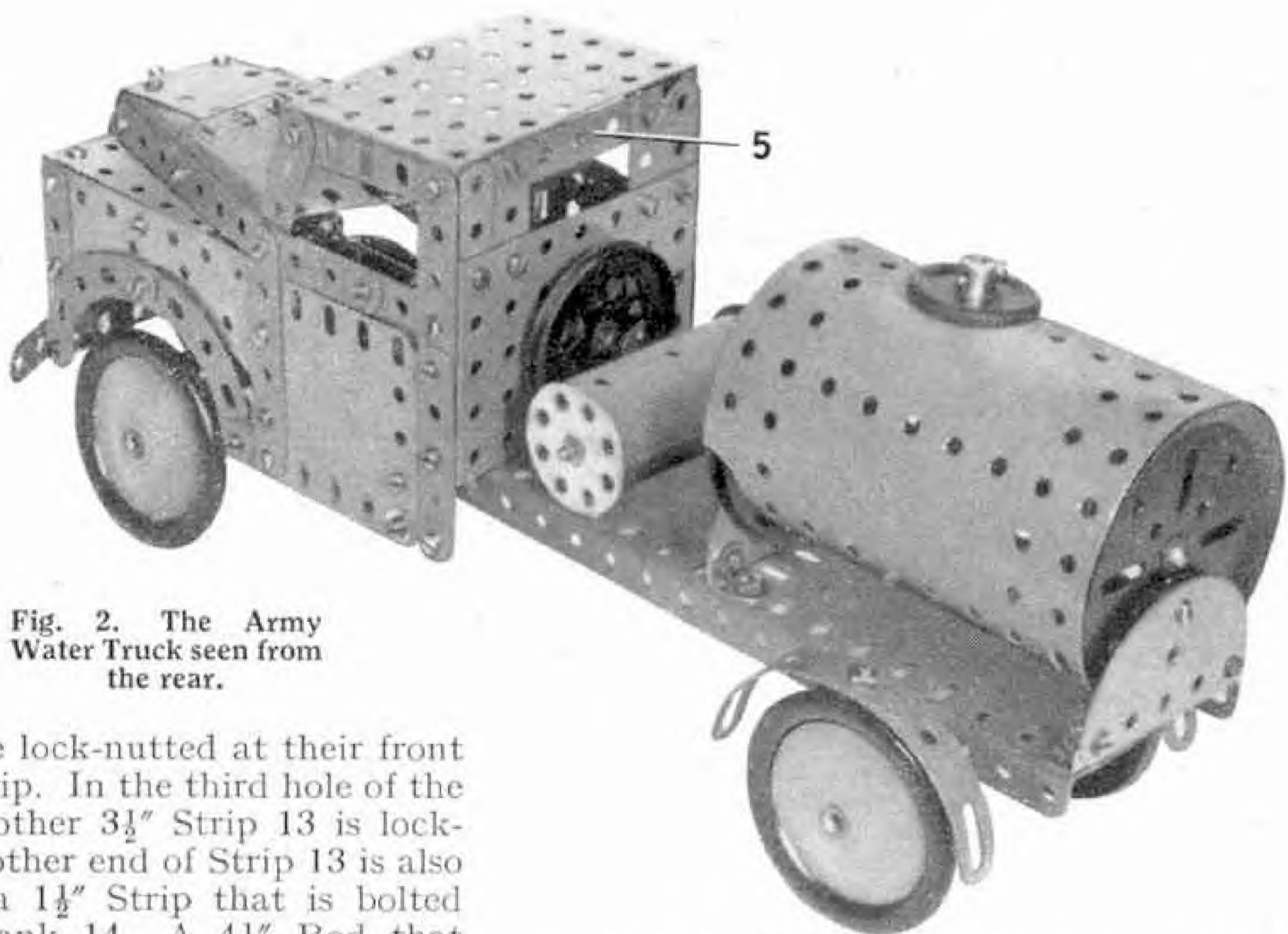


Fig. 2. The Army Water Truck seen from the rear.

the $12\frac{1}{2}$ " Angle Girders behind the cab by means of two $\frac{3}{8}$ " Bolts. Collars are used to space the Cylinder from the Girders. A Wheel Disc is bolted at each side of the Cylinder, by means of a $3\frac{1}{2}$ " Threaded Rod 16 and two nuts.

The water tank consists of a Boiler opened out and the ends filled in by 3" Pulleys, each fixed to the ends of a 5" Rod. The water tank is bolted to the $12\frac{1}{2}$ " Angle Girders by means of a $\frac{1}{2}$ " Bolt and spaced by a Collar. The manhole cover is a 1" Pulley with a Rubber Ring attached.

The rear wheels rotate on a $3\frac{1}{2}$ " Rod that is mounted in two Flat Trunnions bolted to the $12\frac{1}{2}$ " Angle Girders.

Parts required for Army Water Truck: 3 of No. 2; 6 of No. 3; 2 of No. 4; 12 of No. 5; 3 of No. 6a; 2 of No. 8; 2 of No. 11; 12 of No. 12; 3 of No. 12c; 1 of No. 15a; 2 of No. 16; 2 of No. 18a; 2 of No. 19b; 1 of No. 20a; 2 of No. 22; 2 of No. 24a; 1 of No. 35; 110 of No. 37a; 96 of No. 37b; 20 of No. 38; 2 of No. 48; 1 of No. 48a; 3 of No. 53; 6 of No. 59; 1 of No. 62; 1 of No. 80c; 4 of No. 90a; 4 of No. 111a; 6 of No. 111c; 2 of No. 126; 2 of No. 126a; 2 of No. 155; 1 of No. 162; 4 of No. 187; 4 of No. 188; 6 of No. 190; 2 of No. 191; 2 of No. 214; 5 of No. 215; 1 of No. 216; 4 of No. 221; 2 of No. 222.

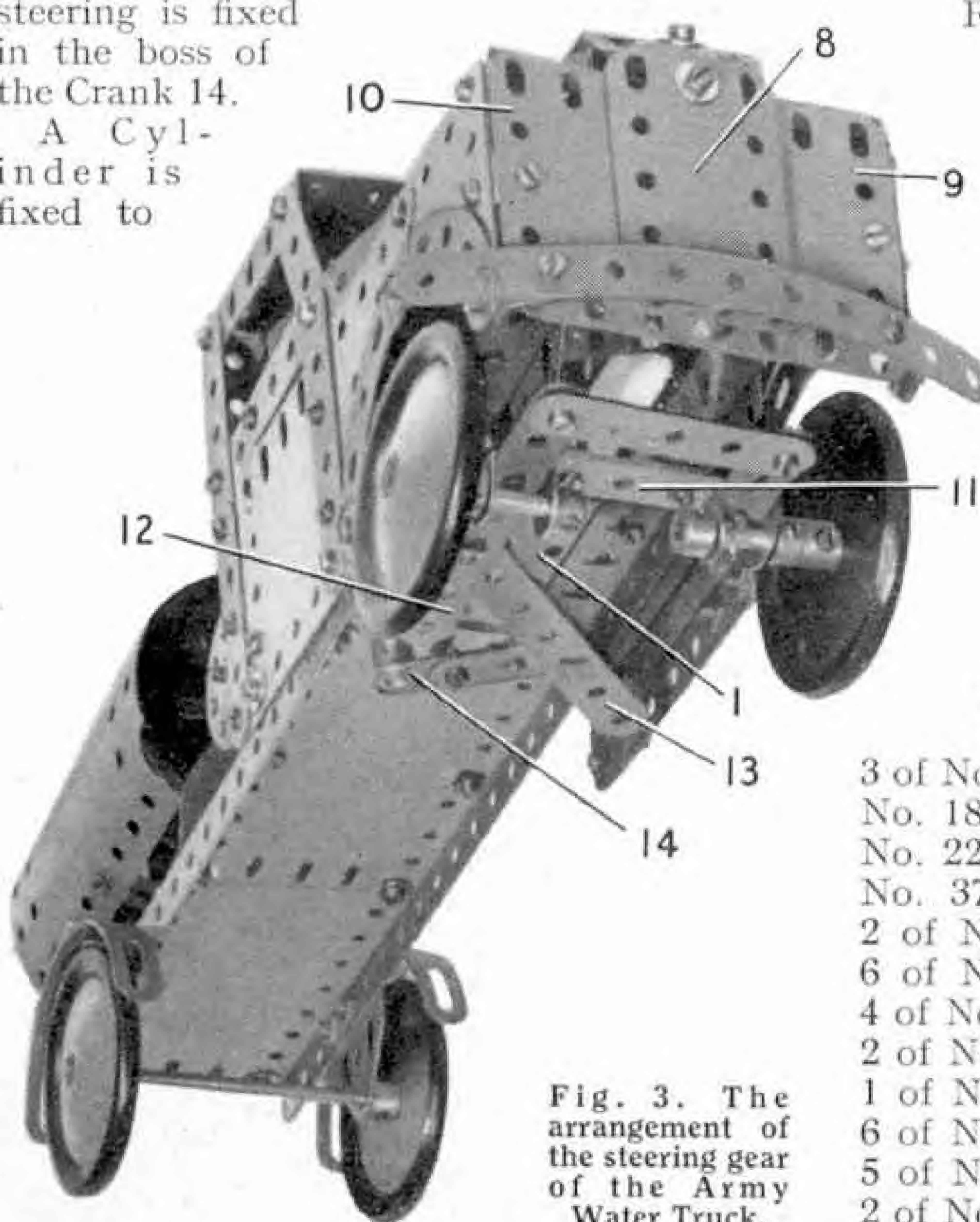


Fig. 3. The arrangement of the steering gear of the Army Water Truck.

Winter Model-Building Competition

Prizes for Models of all Kinds

THIS month we announce the first of our Winter competitions, in which useful cash prizes are offered for the most original and best built Meccano models of any kind. Everyone who owns a Meccano Outfit is eligible to send in an entry.

All a competitor has to do is to think of a new model and then set to work to construct it as neatly and realistically as possible from standard Meccano Parts.

The judges will award the prizes for those models that are the most original in subject, and are most neatly designed and proportioned.

When the model is completed it is only necessary to obtain either a photograph or a good sketch of it and send this to us. The actual model must not be sent. The photograph or drawing need not be the competitor's own work, but it is absolutely essential that the model itself should be the result of his or her own unaided efforts. Entry forms are not required and there are no fees to be paid. The Competition is open to readers of all ages living in any part of the world.

The Contest will be divided into the following two Sections: A, for competitors living in any part of the world and under 14 years of age on 30th January next. B, for competitors aged 14 years or over on 30th January, 1960. A separate set of prizes will be awarded in each Section, as follows: First, Cheque for £4; Second, Cheque for £2; Third, Cheque for £1; Ten prizes, each of 10/-, and ten Consolation Prizes, each of 5/-. A number of Certificates of Merit also will be awarded.

As models of any kind whatever may be submitted, competitors have a very wide

choice of subject. A model that really "works", or that may be put to some practical use, will stand a better chance of winning a prize than a model that is not built to work. Any number of parts may be used in building models, but good solid construction will count more than mere size alone.

When preparing their entries competitors must take care to write their ages, names and addresses clearly on the back of each photograph or drawing submitted.

Entries must be posted in time to reach this Office on or before 30th January, 1960. Envelopes should be addressed *November Meccano Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13.*

Each prize-winner will be notified by letter as soon as possible after the closing date. Prize-winning entries become the property of Meccano Limited, but unsuccessful entries will be returned if a stamped addressed envelope is enclosed.

Among the Model-Builders—(Continued from page 509) extended by a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip that overhangs the $3''$ Strip by one hole. The Flanged Wheels are fixed on $2\frac{1}{2}''$ Rods mounted in the Double Angle Strips. Each Rod is held in place by a Collar, and a second Collar is positioned between the Flanged Wheel and the Double Angle Strip.

The centre shaft is a Rod passed through the Face Plate 1 and through Strips or Angle Girders bolted across the upper and lower Flanged Rings. The Rod can be left free to turn in the bearing, so that in a travelling crane it can be used to transmit the drive from a Motor mounted in the cab to the wheels.

The superstructure can be slewed by driving a Rod 2 mounted outside the Flanged Rings. A $\frac{3}{8}''$ Sprocket on the lower end of this Rod should be connected by Sprocket Chain to the Flanged Ring fixed to the base.

Ten year old John Borkowski, of Montreal, with a model locomotive that won him a prize in a recent Meccano Magazine Competition.





Club and Branch News



WITH THE SECRETARY

AN "IDEAS POOL"

In recording the activities of Clubs and Branches, the reports published on this page perform a useful service as well as giving interesting information. They reveal the kind of programme followed at meetings and the measures taken to ensure successful Exhibitions, and thus indicate to other Clubs and Branches—especially new ones—the direction in which they can extend the scope of their own activities to cater more adequately for the varied interests of their members.

Thus the *Club and Branch News* page is something of an "Ideas Pool", and the more detail given in reports sent to Headquarters by Clubs and Branches the more useful this page can become to its readers.

PROPOSED LONDON MECCANO CLUB

London readers will be interested to hear of a proposed new Meccano Club. The organiser is Mr. G. B. Weightman, who has had previous experience of running a Meccano Club, and his address is 484 Barking Road, East Ham, London E.6. *M.M.* readers interested should get in touch with him as soon as possible, as Mr. Weightman is keen to get his proposed Club established before the Winter season is much advanced.

CLUB NOTES

NORTH END (PORTSMOUTH) M.C.—The Exhibition mentioned last month was a great success, almost 1,000 people attending it. There were clockwork and electric model railway layouts in operation, that of Mr. Firman being illuminated; working Meccano models, Dinky Toys display, model aircraft and ships. Woodwork and metalwork also were featured. Mr. Pilcher, a founder member, displayed his home-built stereophonic sound equipment. *Secretary:* Mr. A. J. Nicholson, 213 Sultan Road, Buckland, Portsmouth.

NEWTOWN SCHOOL (WATERFORD) M.C.—More members have been enrolled. An Exhibition to be held on 21st November will feature Hornby-Dublo operations and a Dinky Toys display. Another visit to the Waterford Iron Foundry is to be arranged. *Secretary:* J. Gillespie, Newtown School, Waterford, Eire.

INDIA

MYSORE M.C.—The Club has recently received from the Darien Book Aid Plan, Inc., U.S.A., a large carton of valuable library books. In view of the increasing work involved in maintaining the Club library and reading room, Mr. K. Ramanna, a founder member, has been appointed Club Librarian. *Secretary:* Sri. M. N. Radhakrishna, Mysore Meccano Club, 16 Mothikhana Buildings, Santhepe, Mysore-1, India.

NIGERIA

GINDIRI SECONDARY SCHOOL M.C.—The members forming Group A have completed the model hammerhead crane, and are now building the showman's traction engine (Outfit No. 10) for the Club's Open Day Display. Group B are building a model racing seaplane. *Secretary:* Paul M. Thahal, Gindiri Secondary

School, Sudan United Mission, P.O. Barakin Ladi via Jos, Northern Nigeria.

BRANCH NEWS

AVIARY MODEL RAILWAY CLUB (LEEDS).—Some excellent cricket matches were played during the Summer. Indoor meetings, especially track nights, have continued, and meetings are now held fortnightly. Members were invited to attend a "Safety First" lecture a few miles away, during which they saw some excellent road safety films. Afterwards the lecturer invited questions from the audience. A forthcoming lecture at the same place will deal with *British Railways*. *Secretary:* J. Baker 10 Salisbury Terrace, Leeds 12.

AUSTRALIA

ST. ALBANS AND NORTH PORT RAILWAY (HABERFIELD).—The railway is to be extended by the addition of a baseboard 6 ft. long x 2 ft. wide, which will enable existing facilities at North Port to be greatly improved. *Secretary:* Mrs. A. N. Skiller, 101 Chandos Street, Haberfield, New South Wales, Australia.



Part of the extensive Hornby-Dublo layout of the Kidderminster Model Railway Club at a recent Exhibition. The three members are (left to right) Neville Price, Stuart Bates and Brian Birch.

HORNBY RAILWAY
COMPANY

By the Secretary

THE Locomotive Headboard and Train Name and Destination Labels have proved extremely popular with Hornby-Dublo Train owners, and even some Gauge 0 enthusiasts have made good use of them in various ways! All this is not surprising, because named trains have been a feature of real practice for many years, and it certainly adds to the distinction of a miniature express as well as a real one if it is given a name. It springs to life, as it were, when it acquires a personality.

As most of you know, there are three types of Locomotive Headboard, one for each of the three principal express locomotive types in the range, and it will be obvious that the same types suit both Two-Rail or Three-Rail Locomotives. The means of fitting the boards to the engines vary, because of differing features in design of each of the engines.

Providing a board for the sloping front of the A4 class presented something of a problem, for it was required to stand upright between the smoke-box number plate and the whistle. The solution arrived at was to provide a slot in the sloping surface of the smoke-box front to receive a specially shaped "tail" forming part of the Headboard for this type of engine. This feature was introduced with the appearance in Hornby-Dublo of the double-chimney *Mallard*, and the same thing now applies to the Two-Rail version of this type, *Golden Fleece*.

This special arrangement meant that owners of the older *Silver King* Locomotive that preceded the *Mallard* could not use the L11 type of Headboard on their engines. But Hornby-Dublo enthusiasts are full of ingenuity, and have found various ways and

Hornby-Dublo Miscellany

Nameboard and Other Notions

means of allowing a name to be displayed on the front of their *Silver King* engines.

One of the simplest is not to use an L11 Headboard at all, but to employ instead the type of Headboard intended for L12 L.M.R. 4-6-2 *Duchess of Montrose*. This type of board has a lug at each end specially shaped to fit behind the hand rails at the side of the smoke-box of the *Duchess* type engines. If these lugs are bent flat, still leaving them at right angles to the face of the Headboard, it is then possible to slip



The Hornby-Dublo "Silver King" can carry a train name if the L12 Headboard is used as described on this page.

them between the handrails at the side of the smoke-box of *Silver King*.

You may have to prise the handrails outward slightly when fitting the Headboard in this way. Take care not to overdo this or the Headboard will not "stay put". As it is, the Headboard arranged in this manner is sloped backward slightly, as is evident in our picture here, but this is better than having no board at all.

This scheme seems to have occurred to quite a number of Hornby-Dublo owners practically at the same time and most of them lost no time in writing to Headquarters. Some *Silver King* owners have devised arrangements involving soldering clips,

wired prongs, and so on to the L11 Headboard to allow this to be attached above the engine front coupling, but the method described is the easiest and most satisfactory.

Other enthusiasts, who have begun operation in Hornby-Dublo Two-Rail, have not been slow to point out an interesting combination made possible from the items so far available. Now that Suburban Coaches in S.R. livery have been added to the System, they can

be run with excellent effect behind the Two-Rail version of the B.R. Standard 2-6-4T. This in fact bears the number of one of these engines, 80033, that is allocated to the Southern Region. It will be quite reasonable for Three-Rail owners to run Southern stock behind their 2-6-4 Tanks and a train made up in this way will add to the variety and colour on almost any layout. In spite of the advance of electrification and the increasing use of diesel power, there are still some S.R. workings that can be reproduced in miniature in this attractive manner with Hornby-Dublo components.

In addition to jobs of this kind, the

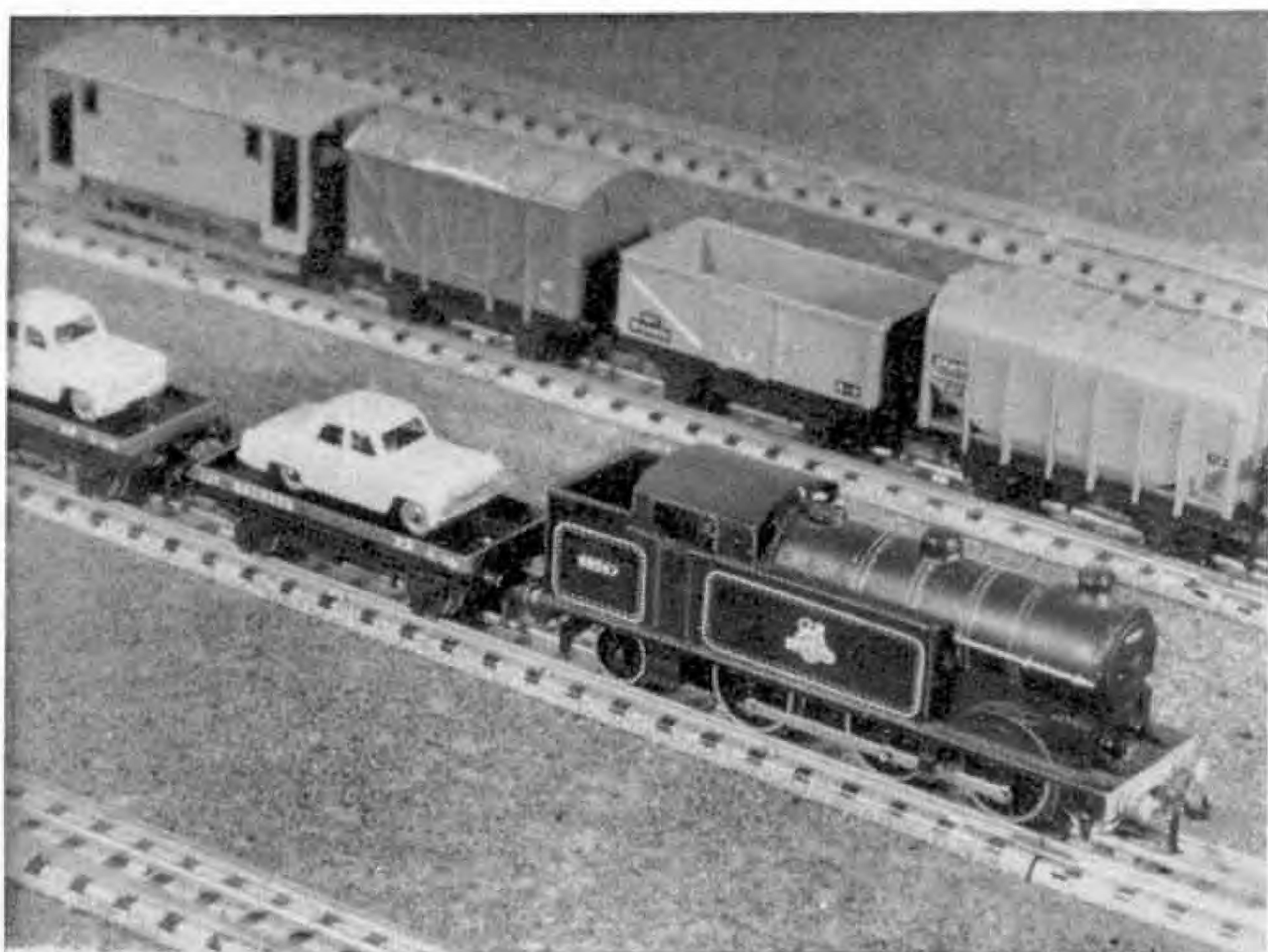


A Hornby-Dublo 2-6-4 Tank passes a siding with a short local train. The siding forms a convenient point for the exchange of traffic with Dinky Toys road vehicles.

Hornby-Dublo 2-6-4T can be run on trains composed of Corridor type stock, even those including a Restaurant Car in their make-up. This sort of thing does happen in real practice, although a 2-6-4 tank may take such a train over only part of its journey. This may be welcome news to some owners of our fine engine, who have perhaps tended to regard it as a more or less suburban type.

Recent additions in the series of Dublo Dinky Toys, such as the Massey-Harris Ferguson Tractor and the A.E.C. Mercury Tanker, previously mentioned in the *M.M.* by *The Toyman*, have helped to increase interest in road matters in Hornby-Dublo layouts.

Good use can be made of all the items so far produced in this fascinating scale, and some readers may already have seen the Tractor used as a load on the Low-Sided Wagon included in the 2-6-4 Tank Goods Train Set in Two-Rail. It is specially suitable for this purpose, or simply for standing about in suitable spots, such as lineside fields, or in the goods yard or depot ready for loading, because there is no driver modelled with it.



A train load of motor cars for shipment behind a Hornby-Dublo 0-6-2 Tank. The cars are Dublo Dinky Toys Ford Prefects, which look well loaded on Low-Sided Wagons.

Some Portable Hornby-Dublo Railways

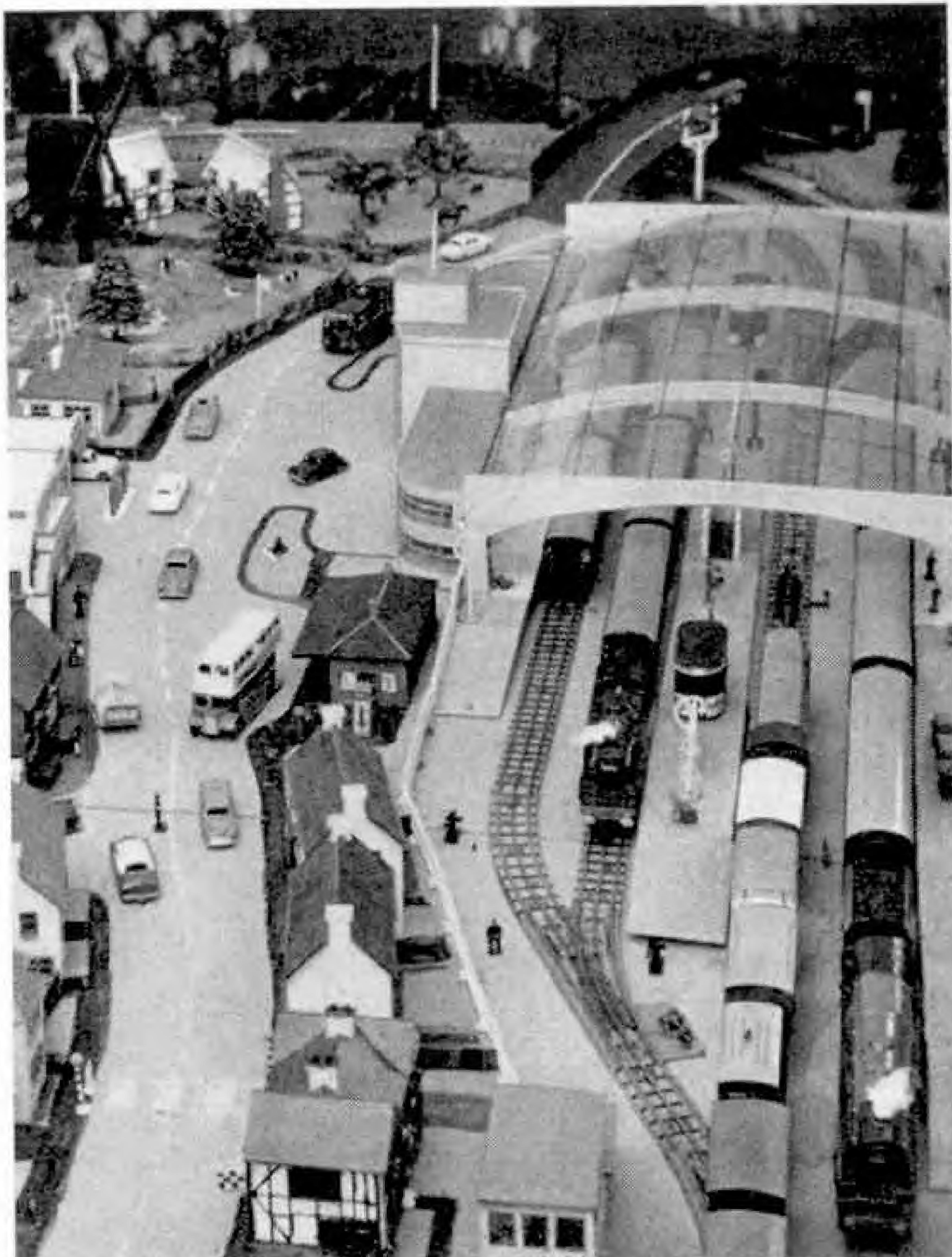
By "Layout Man"

In introducing you this month to the layout of which interesting sections are shown in two of the pictures here I cannot do better than quote from the letter received from the owner, Mr. Mr. P. S. McGowran, at present of Lisburn. In forwarding the photographs from which the illustrations mentioned have been prepared this enthusiast wrote: "Our family railway is small as permanent layouts go, measuring only 10 ft. by 4 ft. Its rectangular shape and its dimensions are dictated by the need for semi-portability.

"As we are a Service (R.A.F.) family we have to move to a new home every two years or so, and the railway must fit into the smaller bedrooms or boxrooms. Up to now these dimensions have met conditions admirably. From the planning aspect the narrow rectangle left much to be desired, but as we wished to make a really workable passenger station the main feature, we were not too greatly handicapped.

"The base is softboard $\frac{1}{2}$ in. thick mounted on hardboard, which is raised on a frame 6 in. above the floor. This has resulted in extremely quiet running. The 6 in. clearance is just enough to allow the electrical wiring to be run beneath the base, and to be "get-at-able" in the event of faults. It also reduces the amount of dust, always a menace with floor level layouts.

"Rugby, the main station, has two through lines and two bays. Close by is a two-track engine shed served by a turntable, and a carriage siding. The approach line to the turntable has ashpits, water supply, and coal bunkers with an overhead conveyor. A continuous run double track



A busy moment at "Rugby" station, on the layout of P. S. McGowran. There are four trains in the station at once.

round the base passes through *Delling*, a suburban station, on the reverse straight. *Delling* also controls a small goods yard with two sidings.

"To break up the narrowness of the landscape, a hill was built from papier-mache, leading up to a road bridge across the main line at *Delling*. A smaller hill in the country at the opposite end is surmounted by a windmill.

"The locomotive stock at present comprises a *Duchess of Atholl*, a 2-6-4T and an 0-6-2T, and a Bo-Bo Diesel-Electric Locomotive. It is planned to add the L.M.R. 2-8-0 8F and another 0-6-2T when funds permit. The normal train for the *Duchess* consists of four corridor coaches and a long-wheelbase goods van, this being the limit imposed by the small dimensions of the track. During peak hours, however, local trains of up to six suburban coaches are handled comfortably at the main platforms, but the bays only accommodate five with the engine.

"The wiring of the track provides for 16 completely independent sections, all of



A general scene at one end of P. S. McGowran's layout, showing a stopping train passing the locomotive yards after leaving "Rugby".

which may be operated at will from each of the two controls. At present signal and point working is all manual, but plans are in hand for the electrification of both systems.

"Almost any combination of movements can be made. This is the prime essential if the railway is to hold the prolonged interest of our four boys, aged 18 months, 7, 12 and 35 years respectively—and of course the ladies of the family — now that the construction phase is complete.

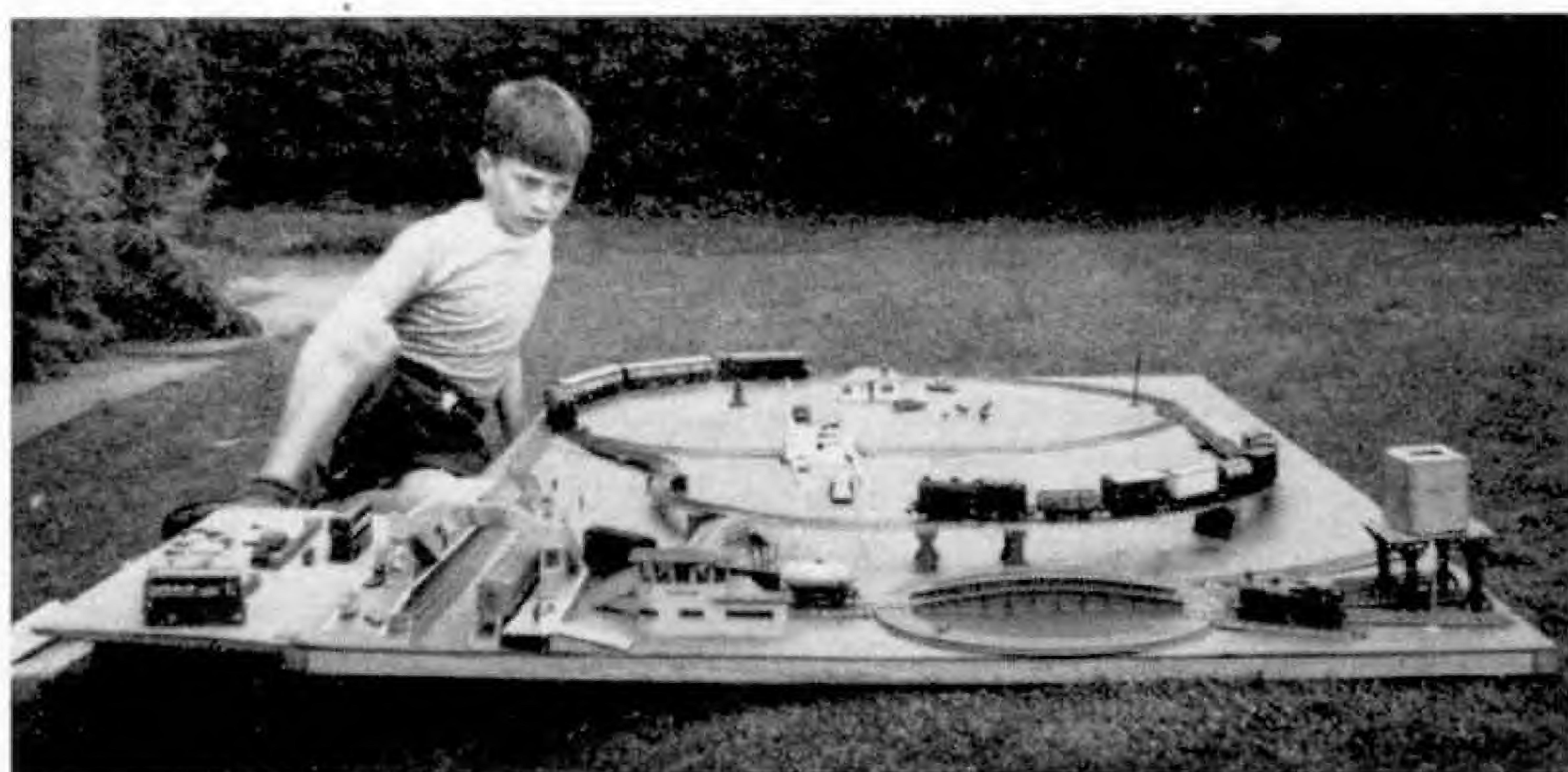
"When moving day comes, the base becomes two sides of a crate 5 ft. by 4 ft. by 2 in., with 12 in. planking forming the edges, and protecting the assembly. Only the rails actually crossing the centre joint need to be taken up, all buildings and scenery being fixed to the base. Packing

consisting of lightly crumpled newspapers provides an adequate safety factor against bumps in transit.

"The resulting box is quite heavy, but is easily handled by the removal men, and reduces to a minimum the dislocation to our railway. A separate container for the rolling stock and control panels ensures that no damage is suffered, and that no delay will be incurred in maintenance on arrival at the next residence."

Well, there you are. Obviously removal of the layout presents no problems to the enthusiastic owner and his family and I am sure that those of you who must have a layout that is really portable will have gained a good deal of useful information from this description.

Another Hornby-Dublo owner who has



James Comrie in the garden with his portable Hornby-Dublo layout ready for action.

a portable railway of a different kind is James Comrie of Perth, whom you see in the lower picture on the previous page. James tell me that his railway is usually in his bedroom, but space is restricted so that the baseboard on which the track and accessories are mounted has to be stored against the wall when running is over. This is easily arranged by the removal of the trains, Dinky Toys and similar items, the remainder of the equipment being screwed to the baseboard.

Although continuous running is possible, over the alternative routes that are clearly visible in the illustration, the system incorporates a short branch on which a terminal station is arranged. Notice how the ramp of the right hand platform has been turned at right angles to the platform itself. This provides a sloping approach from normal baseboard level and "passengers" can reach the other platform by means of the Footbridge.

The turn-table serves several sidings used by locomotives and you will notice that the supports of the water tank standing in the lower right hand corner are made of Meccano Parts. The tank itself is represented by a box of convenient size and I am sure that we can all congratulate the owner on his ingenuity in making and placing this feature.

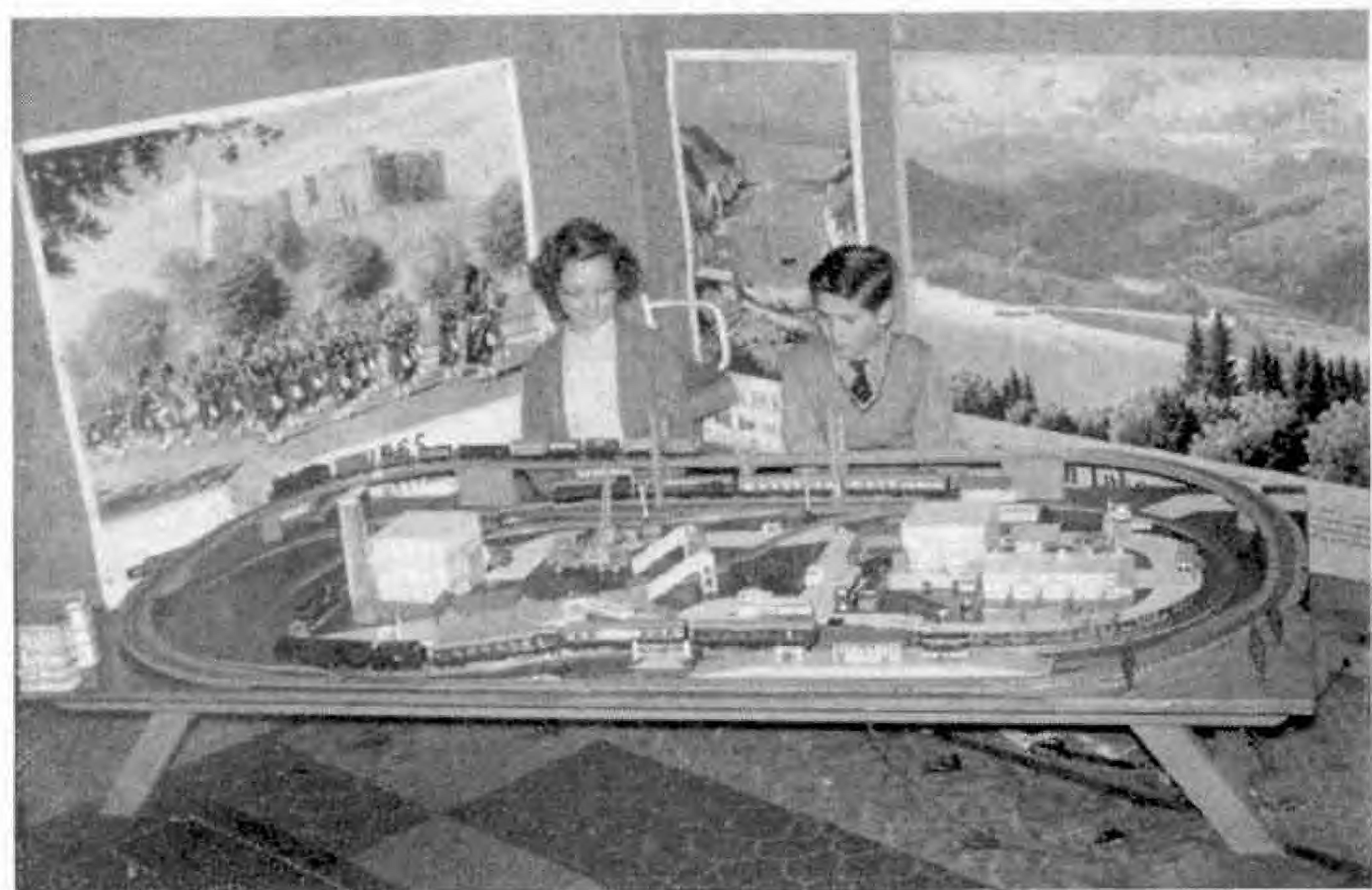
There is no end to variety in baseboards, or indeed to the layout arrangements about which so many Hornby-Dublo owners write to me. In our fourth picture we see Clive Eccles, of Burnley, and his sister Margaret busy with a Hornby-Dublo railway that obviously gives them a great deal of enjoyment. The travel posters that appear in the background provide an attractive setting for the line.

The table on which the system is arranged is made to give a convenient playing level without being too cumbersome.

The base itself is 7 ft. 3 in. by 3 ft. 6 in. and is made of 5-ply wood, well strengthened. The legs that support the table are made to fold beneath it, which is convenient when the railway is moved on to an ordinary table or a suitable shelf.

There are two main tracks on the railway, the outer one being partly at a higher level than the other, which runs at baseboard level throughout. The elevated track is carried on a separate base, as recommended in these pages on various occasions, being supported at intervals by suitably shaped blocks and other members.

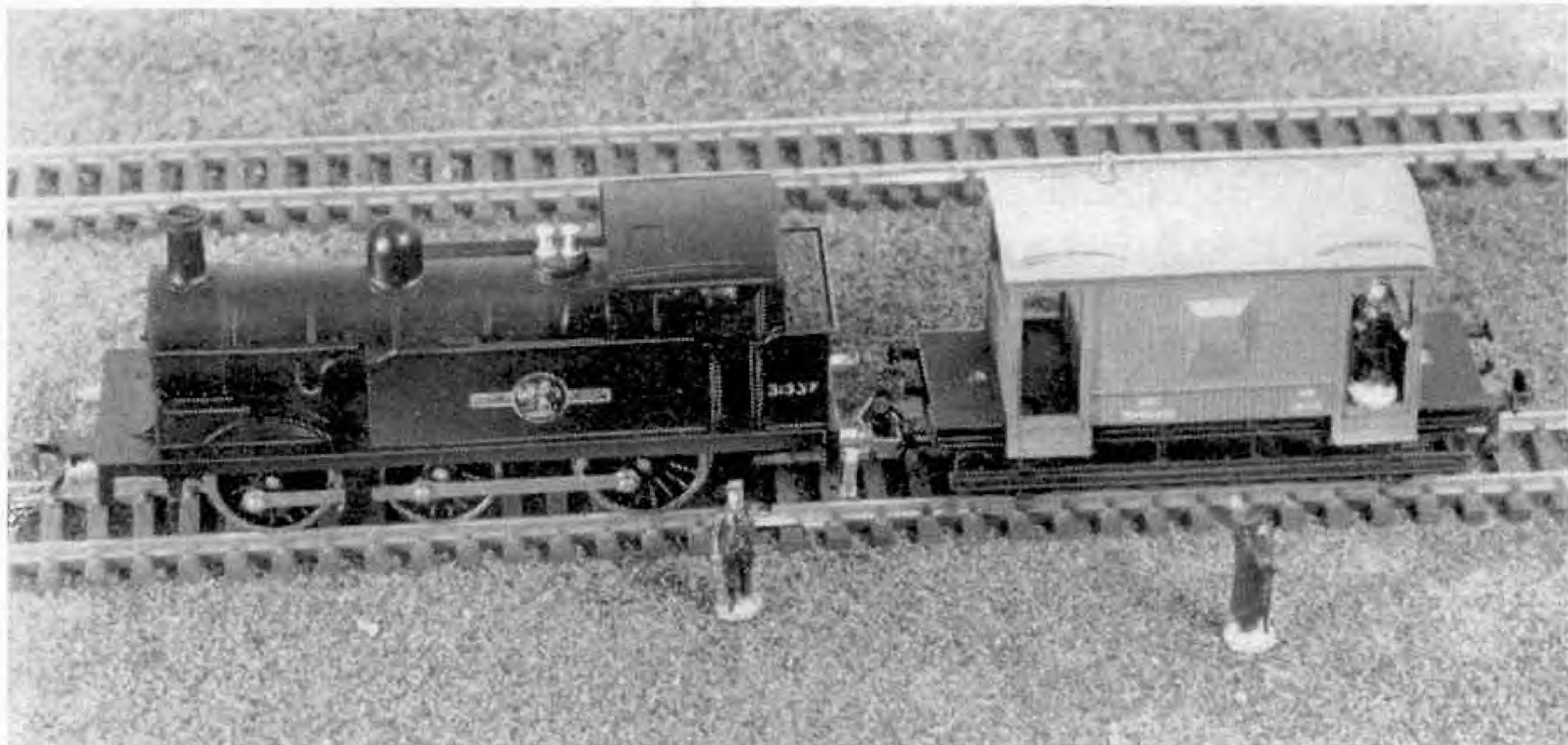
Good use is made of the various Hornby-Dublo Accessories on this layout and there



Clive Eccles and his sister Margaret enjoying running their Hornby-Dublo trains in very attractive surroundings.

are lineside buildings of various kinds that have been made at home. The various activities of the miniature township and the requirements of the several commercial establishments are well catered for by the railway, with various sidings and other facilities for handling traffic. Of course the town has to have a mail service and therefore a T.P.O. Mail Van and lineside apparatus are included in the equipment in order to look after this.

Matters are so arranged that two trains can be in use on their separate tracks at the same time. Express services are run by a *Duchess of Montrose* 4-6-2 and a Restaurant Car ensures that passengers travelling long distances will not go hungry! Local and freight work is carried out by an 0-6-2 Tank, with a Hornby-Dublo Diesel-Electric to help on the freight side.



Two-Rail Talk

By the Secretary

SINCE I first mentioned the introduction of Hornby-Dublo Two-Rail in our talk last May, the first items of Hornby-Dublo Two-Rail equipment have begun to appear, and our advertisement pages in recent issues have given brief details of the train sets that include the new 0-6-0 Tank Locomotive shown in our picture above. Now I am able to say a little more about two-rail matters and you can be sure that the subject will be followed up in later issues.

You will already have admired Hornby-Dublo Two-Rail track, with its neat close-sleepered lengths of flat-bottomed rail. Good contact is essential for two-rail working, as the driving wheels alone are relied on for current collection, those on the right-hand side of the engine being insulated from their axles and from the wheels on the other side. So to be sure of this the rails are drawn in nickel silver, which has high conductivity, and indeed has the further good quality of not being prone to corrosion.

There are 12 curved rails to the circle in Hornby-Dublo Two-Rail, and the radius of the curves and points is 15 in. This last figure is already familiar to Hornby-Dublo three-rail owners, as their Curved Rails are of the same radius and it is interesting to note that as a result approximately the same amount of space is required for any given layout, whether two-rail or three-rail.

The Rails, Points and other components of the Hornby-Dublo Two-Rail system, and how to build up layouts of all kinds

with them will be explained in a special booklet to be issued shortly. In any case, the essential features for satisfactory operation will be known to those who have already obtained Hornby-Dublo Two-Rail Train Sets or Locomotives, as the instruction leaflets packed with them make matters clear so that I need not say a great deal about them here.

One point to note in considering two-rail working is that when we put an engine on the track, whichever way it is facing, the movement of the control handle governs whether the engine moves to the left or to the right, not necessarily forward or reverse. Wiring arrangements are right if the engine moves to the left, with the chimney leading, when the control handle is set for forward running.

The finely detailed appearance of the new engine above speaks for itself. It is a capable little engine with a friendly look, and is well built to deal with light local passenger or freight traffic, and in fact both a passenger and a goods train set including it are available. Those who have seen the Passenger Set will have noted that its appearance marks the introduction into the Hornby-Dublo range of Coaches in the smart and attractive green livery of the Southern Region of British Railways.

These vehicles, which are also available separately, are fitted with moulded wheels, as is all Hornby-Dublo rolling stock in current production, so they are suitable for either two-rail or three-rail running.

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Stamp Collectors' Corner

By F. E. Metcalfe

SPECIAL ISSUES

Recently I read in a stamp magazine an appreciation of a stamp issued by the United States on 14th September in honour of the American Dental Association. The design depicted a sunny-faced girl and two dancing children, and I could not help thinking what an important part in national publicity special issues of stamps of this kind make in all important countries—with the sole exception of our own!

Another special stamp issued by the U.S.A. was described as a "Peace through Trade" issue, and the enterprise and vision demonstrated by foreign post offices show up more clearly every day. When the question of special stamps was raised in the House of Lords some time ago, Lord Chesham drearily repeated the old, old story that "our policy is to have a basic issue of stamps for each reign, commonly remaining unchanged throughout the reign, and supplemented from time to time by special stamps to mark outstanding events in the national life and royal and notable postal anniversaries." "Special stamps are not issued," we were told "to commemorate people apart from the royal and notable postal anniversaries, to mark past events."

There is no doubt one day all this will be changed, and stamps will be used in Britain, as they are all over the rest of the world, as the cheapest and most practical form of publicity available. And how could we use that publicity? Let us suppose that we were following the lead of other countries, but applying the medium to our own needs.

Fairly recently the Government was most anxious about the poor response their invitation was meeting from the younger end of the population to be inoculated against polio. A special postage stamp, with an arresting design, would have provided one means of wonderful publicity for the Government's appeal. And here is a further example. Each year there is a Savings Week Campaign, and again an attractive stamp would be a wonderful help.

But if we collectors are not to be allowed to make a display of our own British special issues, then there are plenty from abroad to keep us busy; and I am going to suggest to any looking for a new field that will not be too philatelic or complicated, that they should consider building up a special issue collection.

Years ago, I started one myself, and only the outbreak of war, with other commitments that followed, put an end to progress with it. So far as I had gone, the collection had provided me with an awful lot of fun, and when I came to sell it the price it brought was well above what it had cost in cash! But a word of warning here. I am not claiming that if you start on regular lines to form such a collection, and then grow tired of it, you will make a cash profit on top of all the fun you have had.

That great and wise philatelist, the late Fred Melville, once remarked that the profit you obtain from a collection should be that you get from collecting the stamps.

It is no use going in for a special stamp collection if all you propose to do is to buy sets and then

just stick them in your album. The fact that the stamps are special means that they had a particular object behind their production, and the real fun comes from finding out all about that object, and writing the matter up after carefully mounting the stamps concerned.

I have frequently pointed out how, with even a little practice, one can become quite expert in hand printing, and if you will indulge in that bit of practice, apart from having a collection of stamps that will appeal to everybody, whether they collect stamps themselves or not, you will have acquired a skill that can be of use as well as pride to you.

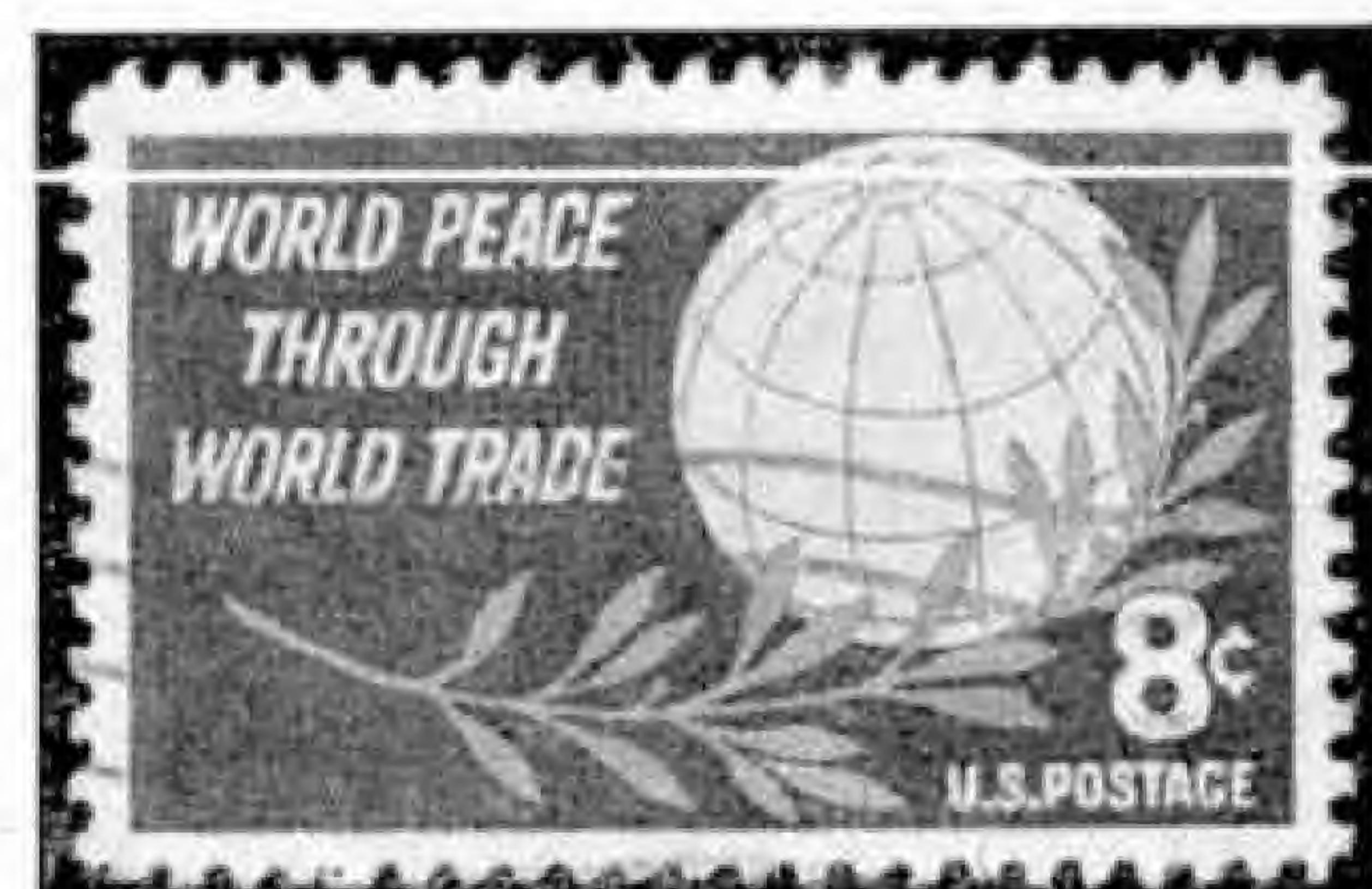
And what kind of writing-up is suggested? Well, as an example of what I have in mind, take the "Wild Life Preservation" issues of Canada and the U.S.A. Animals or birds are depicted on these special stamps. They only cost a copper or so each, and all are very attractive, as they have to be, to achieve their publicity object. If this or any similar set is represented in your album, find out something about the habits of the creatures illustrated, and write or print a sentence or two on each under or above each stamp concerned.

You will get all the information you need from a reference library.

In connection with this let me refer to a letter I received recently from a

reader. My correspondent lives in the country, several miles from the nearest town where a reference library is situated. He told me that he and his son were forming a collection together, and after having made a note of the information required, they went off to the town early on a Saturday morning, and by mid-day had found out all they wanted to know. Now that refers to country people. Those in towns have the information just round the corner.

The newspapers often provide the information you need. For instance, Argentina issued a flood stamp some time ago. A flood region was depicted and details of the disaster were given in our newspapers when it occurred. And so on and so forth.



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For other Stamp Advertisements see also pages 520 and xxii

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Stamp Gossip

CULTURE 1959

Belgium is noted for its beautiful stamps, and as many British collectors must have been over in that little country for a summer holiday, it is fairly certain that many of them would buy a very fine issue of stamps released on 6th July to mark the 400th anniversary of the Brussels Library. This was founded on 12th April, 1559.

As Philip II was the monarch reigning at the time, to him went the credit. There are six stamps in the set, five bearing portraits of rulers and the sixth and top value the Arms of Philip the Good. A set only costs a shilling or two and will make a handsome page.

AVIATION

To young people today the fact that one can go anywhere by air in a world mostly covered by airlines means very little. Those of us who are older, particularly those who have travelled about a bit, find it harder to get



used to it.

Take Argentina, for instance, a country that recently issued stamps commemorating its airlines. When I lived in Patagonia for a time, both before and after the first World War, one could go up to Buenos Aires by car, but that was some journey, one only for the hardy, for the so-called roads were mostly mere stony tracks.

So the usual means of going north was by steamer. There was only one of these every two or three weeks, and how we did look forward to the arrival of the boats that brought our mail! If it was from England, we talked of miracles of speed if the total journey had taken anything less than a month. Now, of course, Argentina is netted by airlines, and I suppose too that letters posted in Europe will be delivered to the southern tip of South America inside a week.

DESIGNS

The other day I listened to a spirited argument on stamp designs, an angle of collecting that interests most of us, and one of the contestants had some very pungent comments to make on our own special issues, such as the 1957 Jubilee Jamboree, etc.

The other collector engaged in the discussion was only lukewarm about our own stamps. It was agreed that British stamp designs are too elaborate and that the inclusion of a portrait added to the designer's difficulties. Indeed,



stamp catalogues testify.

UPSETS

This is the time of the year when collectors get their new catalogues, and are thus able to check on what stamps, if any, they have missed since the previous editions were published, and to find how they have fared in price. Collectors are notoriously averse to buying books on their hobby, and this is a great pity, for all too often the expenditure of a few shillings would not only yield enjoyment, but would result also in actual cash saving. I remember seeing a stamp sold a few months ago for £60. It had been bought for 5/-



CASTLES IN SPAIN

Last year Spain issued a stamp, in a set marking the 17th International Congress of Railways, that attracted me very much at the time, and as I have just come across the copy I put away, I am going to ask the Editor to illustrate it, for I am sure that the theme will interest many readers.

Spain is producing, along with its neighbour Portugal, some of the most beautiful of stamps. They are not flashy either, as are some of those issued by, say, Monaco, for even the average Spaniard has good taste to his fingertips.

TIP OF THE MONTH

I wonder if I have already mentioned the Dominica "QE" 48c value, which was replaced a few months ago by a stamp of the same value, in a new design. This stamp with the "Lime Plantation" design (CW 43) looks like being such a good item, however, that even if I have it will bear further commendation.

Recently the Crown Agents advised that fewer than 50,000 copies of the stamp had been sold before it was replaced, and I heard on all sides how scarce this stamp is when I went in June to the London Stamp Bourse. The face value is 2/-, and I think you might be able to buy a copy for around 5/-. If you can, and need one for your collection, do not hesitate to buy.



that fine artist the late Edmund Dulac, who tried his hand several times at the task, thought this too much of a good thing.

Finally the conclusion was reached that a design cannot be too simple, and one of the very best recent examples of this was that from Monaco illustrated here. Monaco is a country that should know how to produce fine stamps, for the officials there have had plenty of practice, as the

Man in Space—(Continued from page 481)

curved face, made of metal honeycomb, will crush slightly to absorb the landing impact. If it lands at sea, the capsule will float. A beacon will send out homing signals to guide rescuers in retriever ships, 'planes and helicopters, a high-intensity light will begin flashing and signal rockets will be available. In addition, the pilot will be able to talk by radio with his rescuers.

Throughout his journey of, perhaps, 4½ hours, instruments will have kept a careful check on the way his body and mind reacted to the first long journey through space. The data they record or radio back to Earth will pave the way for the men who will follow that first U.S. space-man on voyages of discovery to strange new worlds, far beyond the atmosphere that protects us from dangerous radiation but shuts us off from a universe full of knowledge and wonder.

Welding Giant Steel Pipes—(Continued from page 487)

the pipes rest, so that the whole assembly is slowly rotated, while the operators carry on their work.

When the inside welding is completed the operators weld the outside of the seams, working from a platform above the liners, which are again rotated.

When the 18 ft. lengths have been completed, they are removed from the shop on bogies running on a special transport line. They are then carefully examined and radiographed, and any defects discovered are repaired. Finally they are taken to the site where they are to be used on special long-base motor lorries that carry two 18 ft. lengths at a time.

For our picture, and the information given in this article, we are indebted to Murex Welding Processes Ltd.

Space Notes—(Continued from page 489)

The satellite would be about 150 ft. long, 6 ft. in diameter and would weigh less than 400 lb., much of it consisting of light weight aerials. It would orbit about 100 miles above the Moon, telemetering its readings back to Earth for analysis. It would carry a 3 to 4 kW nuclear power plant to supply the transmitters and auxiliaries. Radar signals would be simultaneously transmitted on about 10 different frequencies, to allow a complete analysis of depth and composition of the dust to be made.

The all-up weight of the vehicle at take-off would be about 250 tons, with some 750,000 lb. first-stage thrust. These may sound rather high figures, but are less than some projects at present under active development. A retro-rocket would be used to slow the vehicle down to the required orbital speed when it approached the Moon.

Dinky Toys News—(Continued from page 500)

accessories have been constructed and deployed in this scene, which depicts police-controlled crossroads and enables Christian to display his extensive collection of Toys to very good advantage.

I expect that most of those who read these pages are members of the Dinky Toys Club, but as there may be some who have friends who have not yet joined the ranks, I want to urge them to remind their pals of the fun they are missing. Remember it is only necessary to be the owner of one Dinky Toy to be eligible for membership, and the Secretary will be very pleased to receive applications from anyone who can fulfil this condition.

BINDING CASES

In these very useful binders, 12 copies of the *Meccano Magazine* are held in position by specially designed wires fitted on stout and well-secured leather thongs. Single copies can be inserted as received. The cover is maroon with the words *Meccano Magazine* in gilt. Price 9/6d. post free.

Readers should write to the Publishing Department, *Meccano Magazine*, Binns Road, Liverpool 13, enclosing a Postal Order for the appropriate amount.

Easy Model-Building—(Continued from page 497)

Parts required to build the Helicopter:—4 of No. 2; 2 of No. 5; 4 of No. 10; 4 of No. 12; 1 of No. 17; 2 of No. 22; 1 of No. 24; 18 of No. 37a; 17 of No. 37b; 2 of No. 38; 2 of No. 48a; 2 of No. 90a; 2 of No. 111c; 2 of No. 126; 2 of No. 126a.

Parts required to build the Dragline Excavator:—2 of No. 1; 6 of No. 2; 8 of No. 5; 2 of No. 11; 8 of No. 12; 1 of No. 15b; 2 of No. 16; 1 of No. 17; 1 of No. 18a; 1 of No. 19g; 4 of No. 22; 1 of No. 24; 2 of No. 24a; 5 of No. 35; 53 of No. 37a; 44 of No. 37b; 8 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 2 of No. 111a; 2 of No. 111c; 2 of No. 125; 2 of No. 126; 4 of No. 142c; 1 of No. 176; 1 of No. 187; 2 of No. 188; 2 of No. 190; 2 of No. 191; 2 of No. 192; 2 of No. 214; 2 of No. 221.

"THE RAILWAY RACE TO THE NORTH"

By O. S. NOCK, B.Sc.

(Ian Allan Ltd., 25/-)

It is difficult nowadays, long after the individual railway companies concerned have ceased to exist, to appreciate the rivalry that existed last century between London and Scotland. This rivalry broke out into fierce struggles between the King's Cross and Euston groups on two occasions, in races from London to Edinburgh in 1888, and in speed contests between London and Aberdeen in 1895, by which time the Forth Bridge had been opened and the East Coast companies began to press their rivals north of Edinburgh. The climax was reached when the 540 miles from Euston to Aberdeen were covered in 512 minutes, a record that stands to this day.

Mr. Nock has told the full story of these historic events, with the personal recollections of some who actually witnessed something of the 1895 contest. The routes themselves are compared, details of the train and locomotive working are given and the account brings to life again the excitement of the old rivalry.

A fine selection of illustrations is included, with tables relating to the running of the trains and appendices giving records of engine work on both routes.

**THE COMMONWEALTH CATALOGUE
OF KING GEORGE VI STAMPS**

Here is the eighth edition of this now well-established catalogue, which first appeared in 1951. This in itself shows how valuable this old favourite has become, and the demand for the latest issue indeed shows it to be more popular than ever. The editor is an expert in this field. The prices quoted, including those for a wide range of variations of all kinds, are based on a keen study of the market not only in Great Britain, but also in Canada and the United States, where the stamps concerned are keenly sought after, and this, in conjunction with the completeness of the lists makes for the reliability for which we look in a stamp catalogue.

Wherever possible complete information is given, particularly on shades, and the catalogue itself is attractively printed, with first-class illustrations of the stamps in half-tone. It provides a wealth of information not readily available in any other one, and is essential to anyone seriously collecting stamps of the period.

The cost of the catalogue from stamp dealers is 7/6d. It may be obtained direct from the Commonwealth Stamp Co., Leather Lane, Liverpool 2, postage 8d.

MISSING CITY OR TOWN!

In their advertisement in our October issue, Temple Press, Ltd. offered a free specimen copy of *The Motor* to readers of the *M.M.* One reader, D. Kattan, 14 Beauchamp Road, forgot to put the name of his city or town on his coupon, and so became the only applicant to whom a copy of *The Motor* could not be sent. He is asked to write again to Temple Press, Ltd., Bowling Green Lane, London E.C.1. giving his full address so that a copy can be sent to him.



A doctor at a free dispensary examined an actor out of work, and then handed him three pills. "Take one after every meal", he prescribed, "and let me know if there is any improvement."

A week later the doctor met the actor on the street and said, "Why haven't you called to report to me?"

Actor: "You told me to take a pill after every meal, didn't you? You gave me three pills, didn't you? Well, I've still got two pills left."

* * * *

A party of amateur cave explorers entered a huge cavern.

"You know," remarked one, "this is something of a busman's holiday for me."

"Why is that?" he was asked.
"I'm a dentist."

* * * *

"Now, don't forget, Mary," Lady Kumber instructed her new maid, "we are usually referred to as the 'Richmond' Kumbers, to distinguish us from—"

"I know, ma'am," said the maid, "from the Kew Kumbers."

* * * *

Two burglars were "doin' " a big London store. "Look at the price of these suits," said one.

"Downright robbery, I call it!" agreed the second.

* * * *

"Guilty or not guilty?" thundered the judge.

"Dunno," said the prisoner meekly. "I ain't heard the evidence yet."

* * * *

Park warden (to old lady about to sit on a newly-painted bench): "You mustn't sit there, ma'am."

Old Lady (haughtily sitting down): "What cheek! Here I am, and here I'm going to stick."

Fireside Fun

"What is your occupation?"
"It isn't an occupation—it's a pursuit.
I'm a bill collector."

* * * *

"Waiter! Your finger is in my soup!"
"Don't worry, sir, it's not hot."

BRAIN TEASERS MISSING WORDS

The six missing words in the following verse all contain the same five letters. What are the words?

Mary sat with ____ in hand.
Writing ____ dramatic.
Did she ____ the plots she planned?
Negative emphatic!
____ to us the ____ may be.
But at ____ they're new to she.

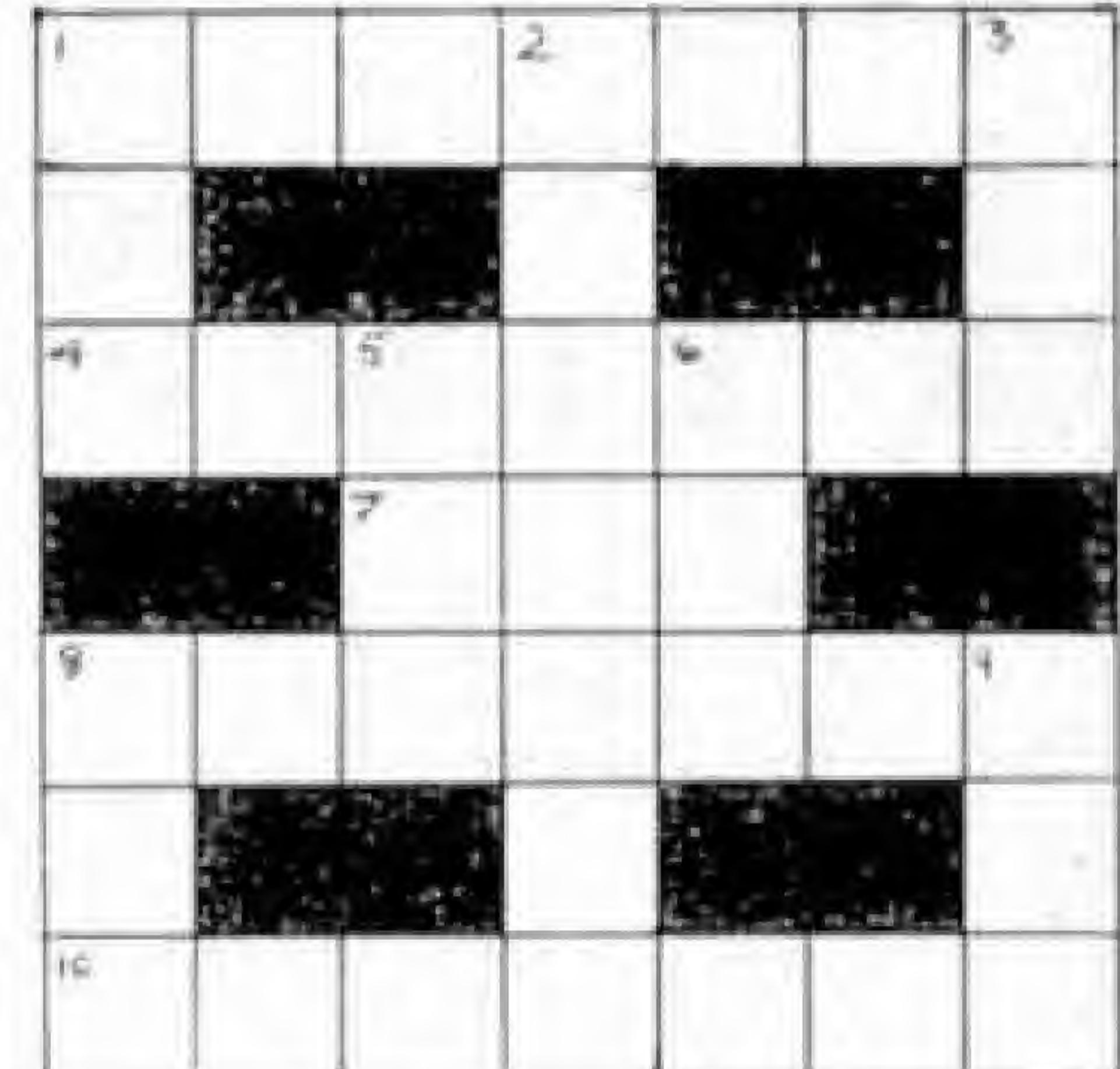
QUICKIE CROSSWORD

Down

1. This is anything but bright.
2. Drinking and seeing is aided by these.
3. Most large towns have one (abbreviation).
5. The first and last letters are the same.
6. Knock repeatedly.
8. Just a tiny —
9. A kind of hill.

Across

1. Plan.
4. Ruler.
7. Indicates a great country.
8. Usually brings bad weather?
10. Found in hospitals and builders' yards.



ANSWERS TO LAST MONTH'S PUZZLES

What am I?

The four clues given should readily enable readers to realise that the solution to this puzzle is *Camomile*.

A Match Puzzle

The solution to the match puzzle is shown in the sketch below. The matches are first arranged as shown and those marked A and B are the ones to be removed to leave six squares.



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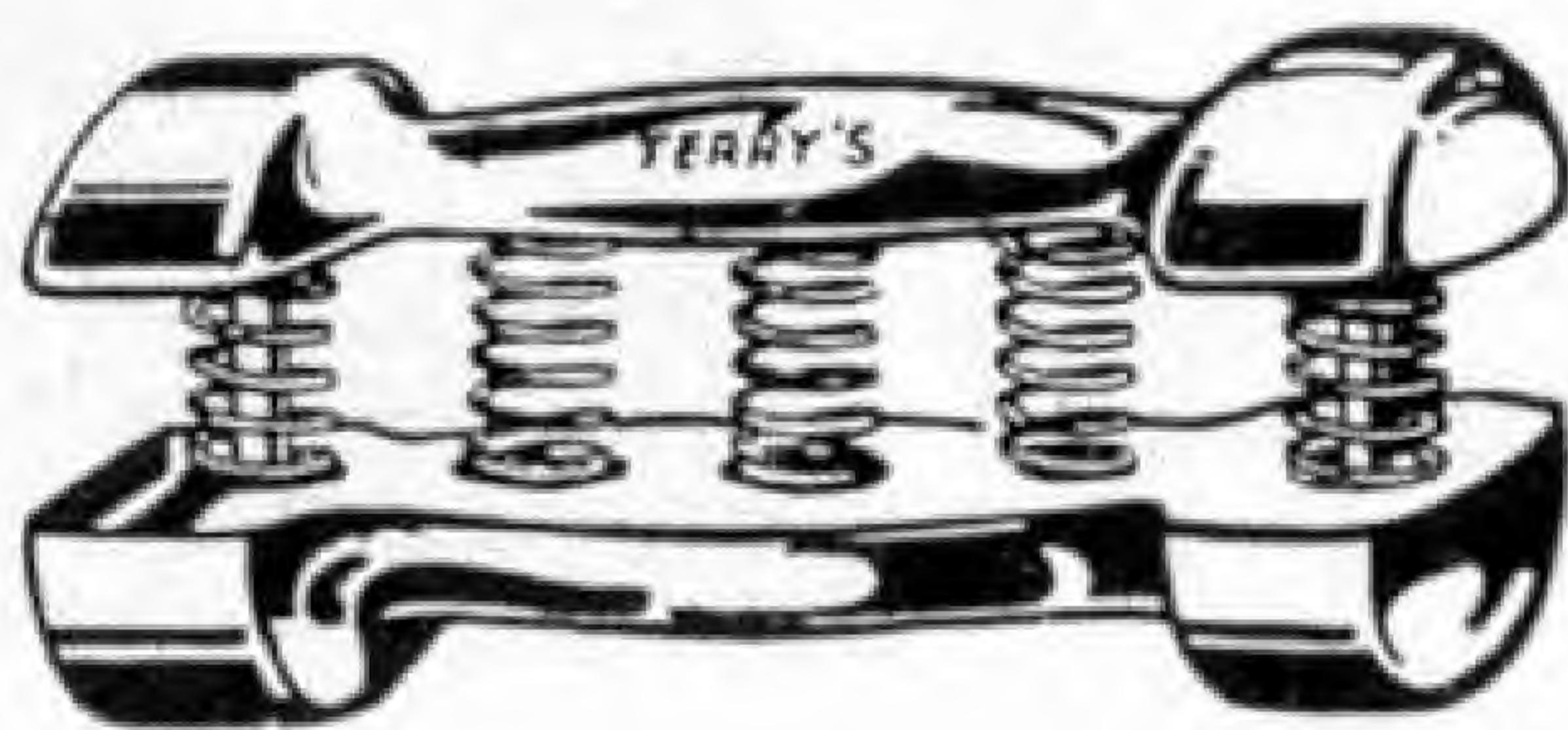
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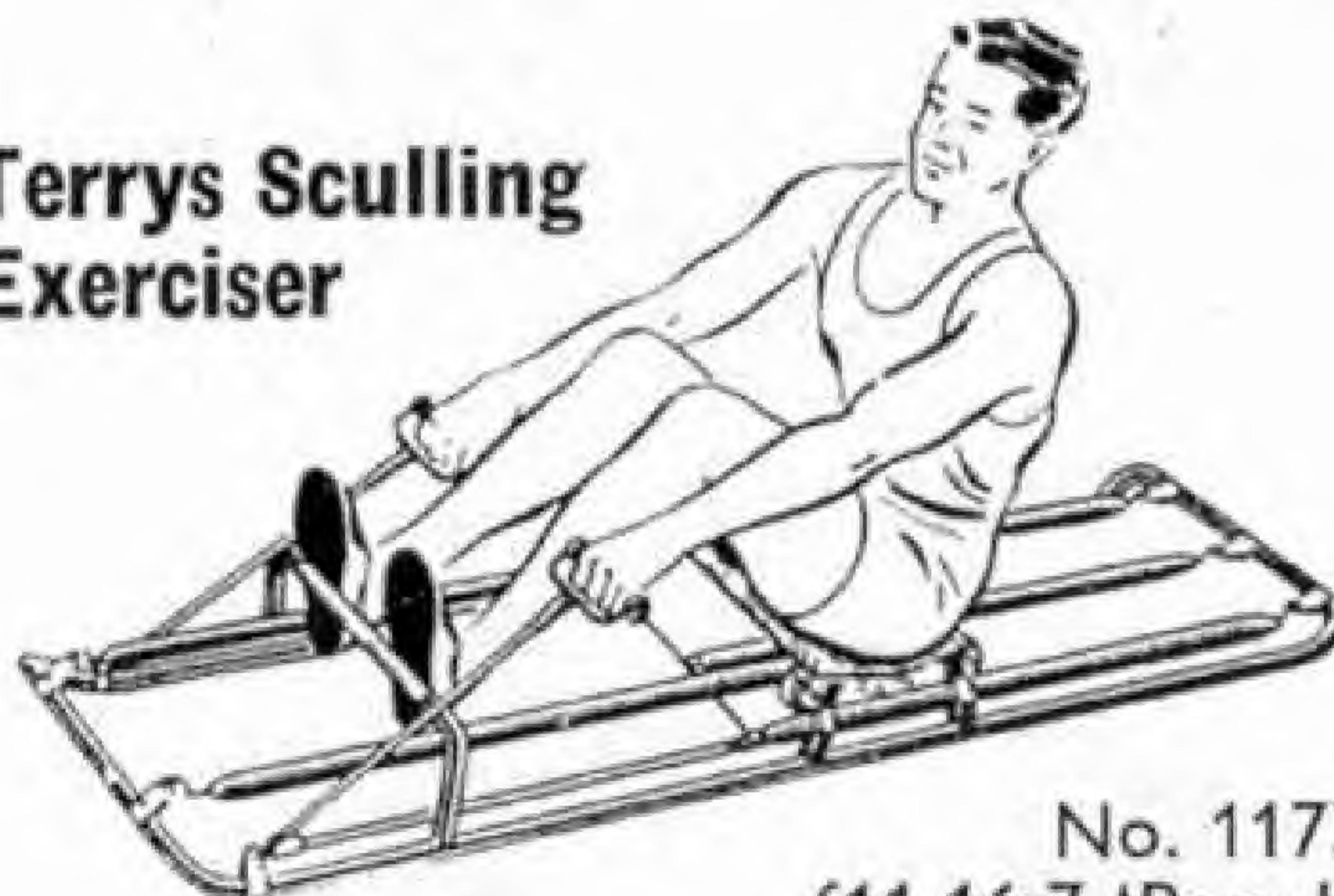
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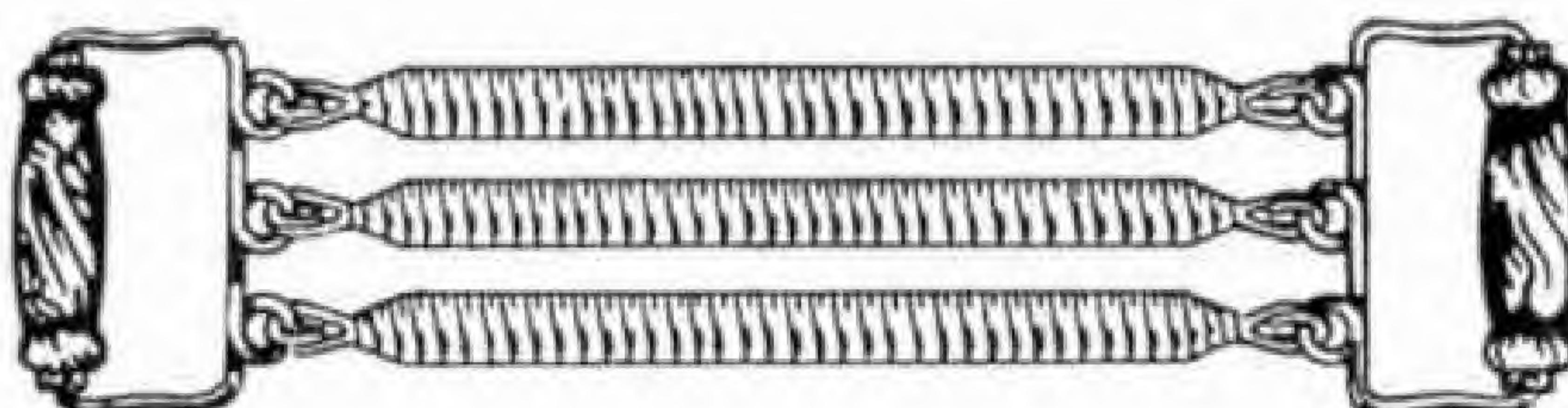


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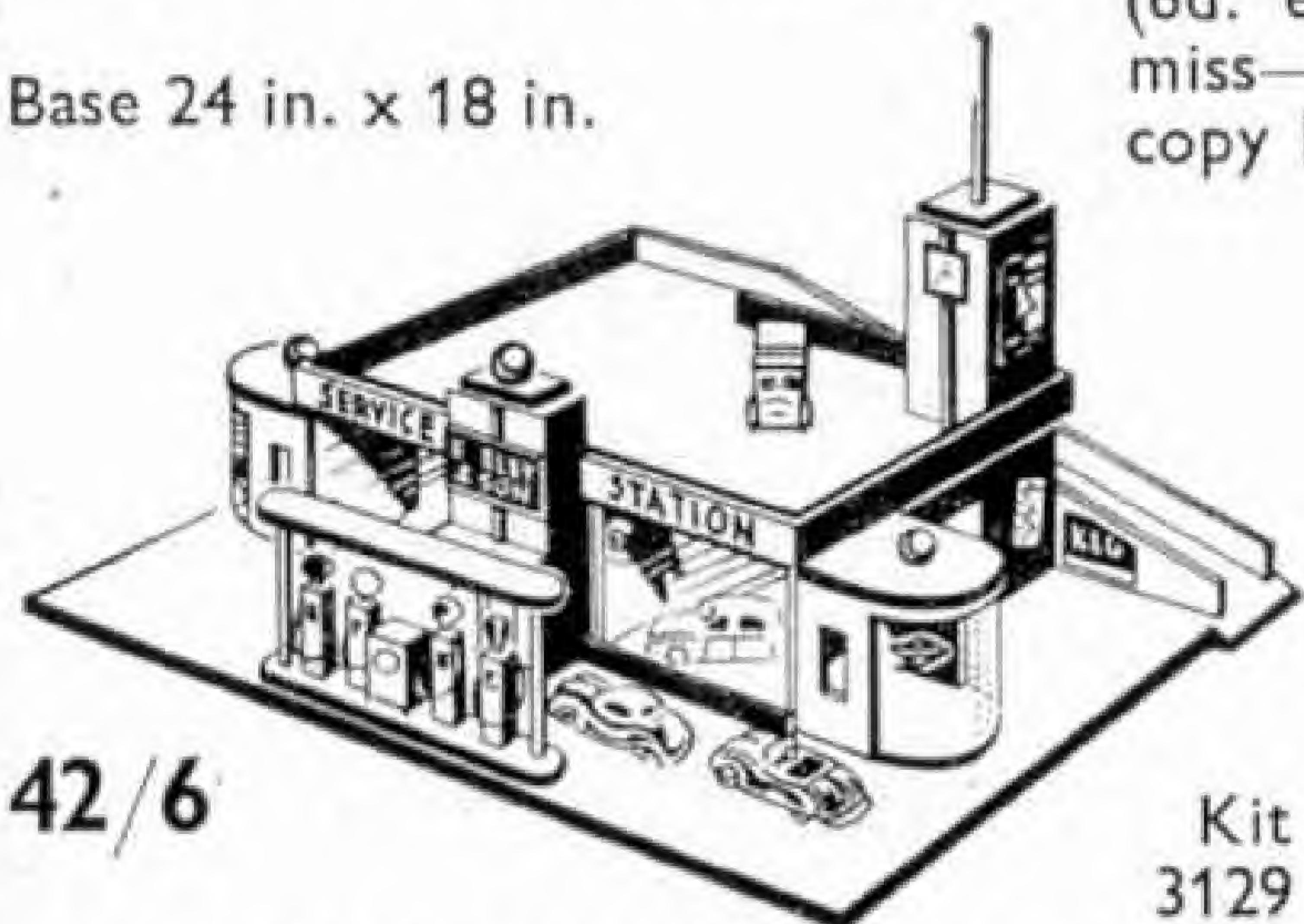
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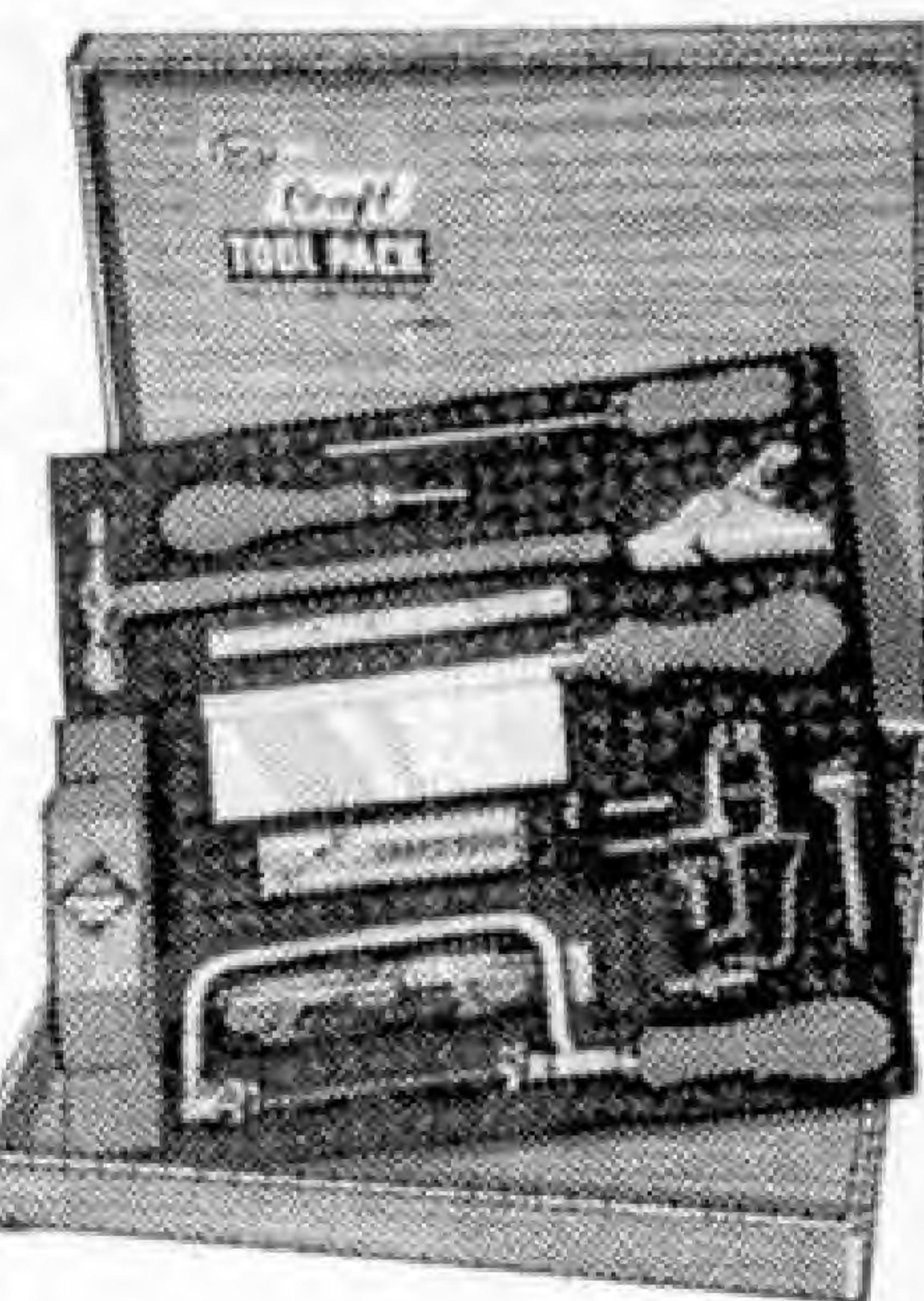
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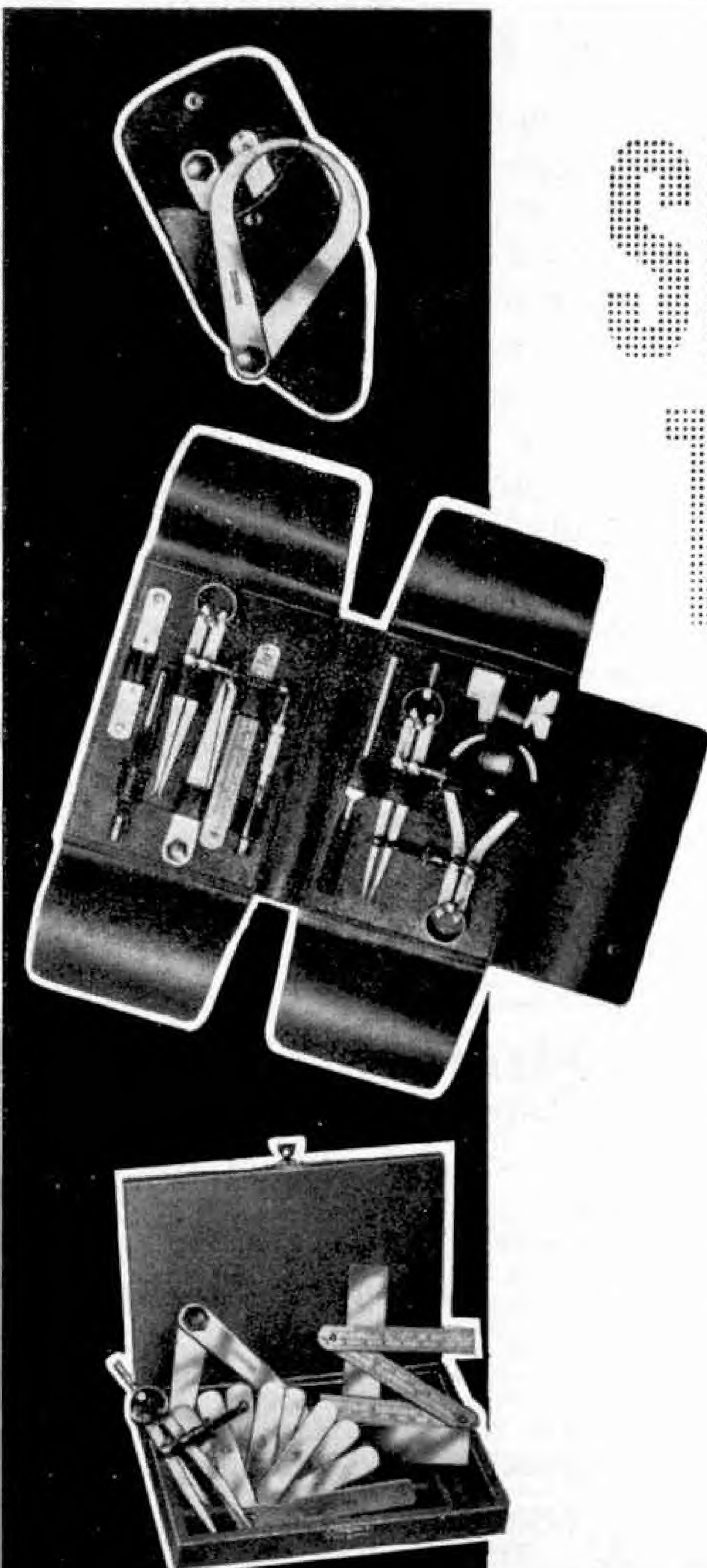
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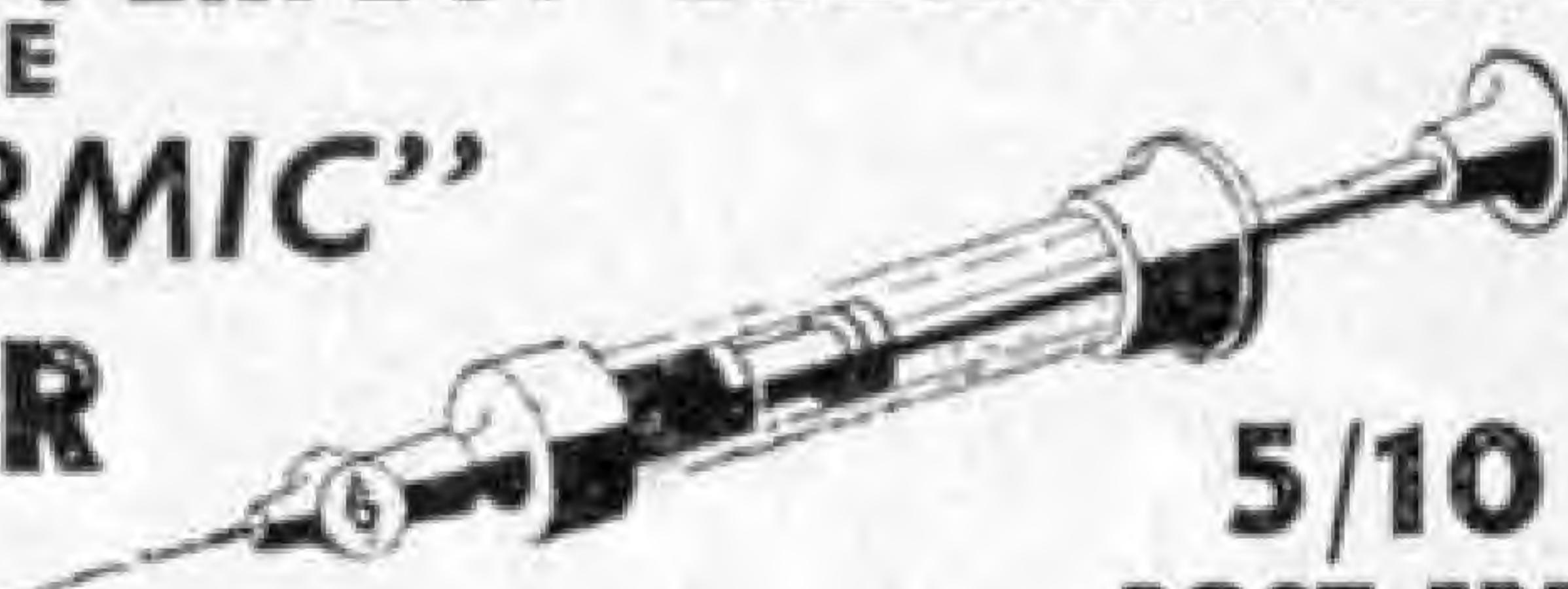
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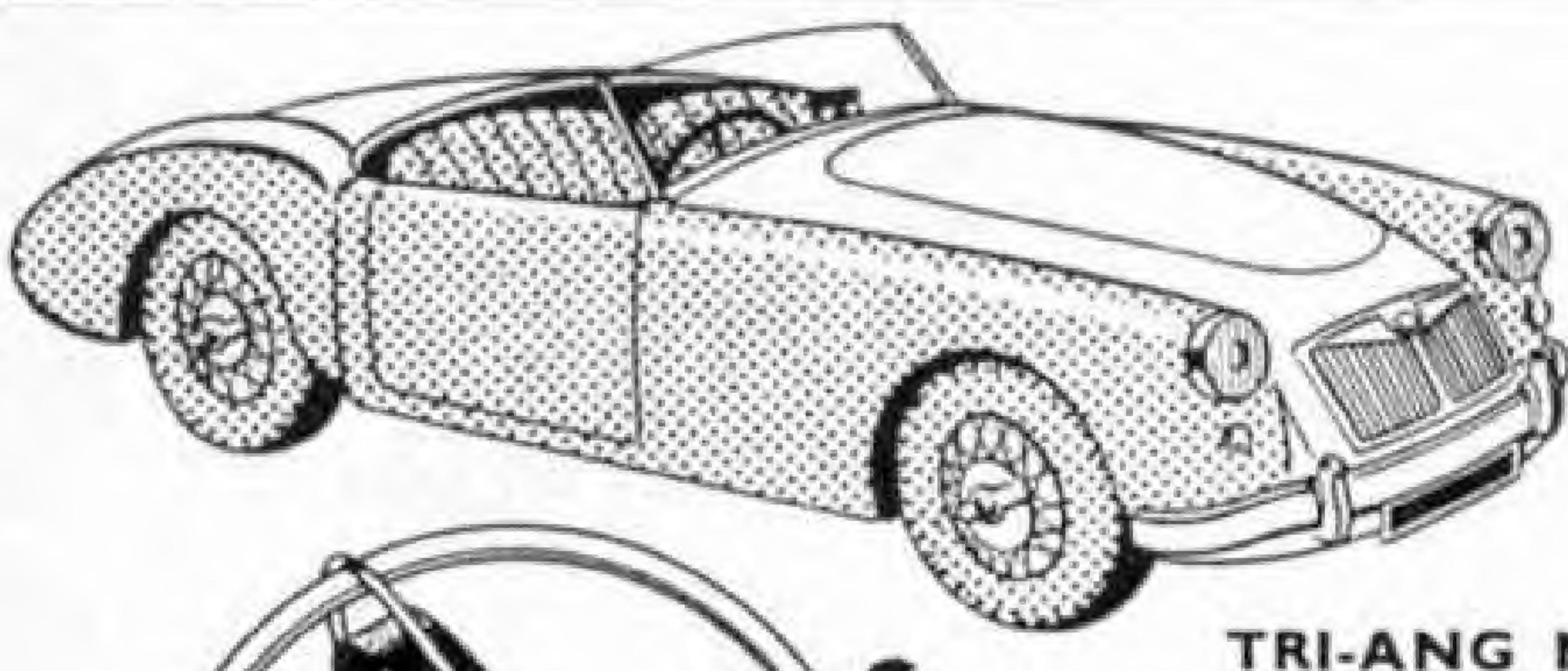
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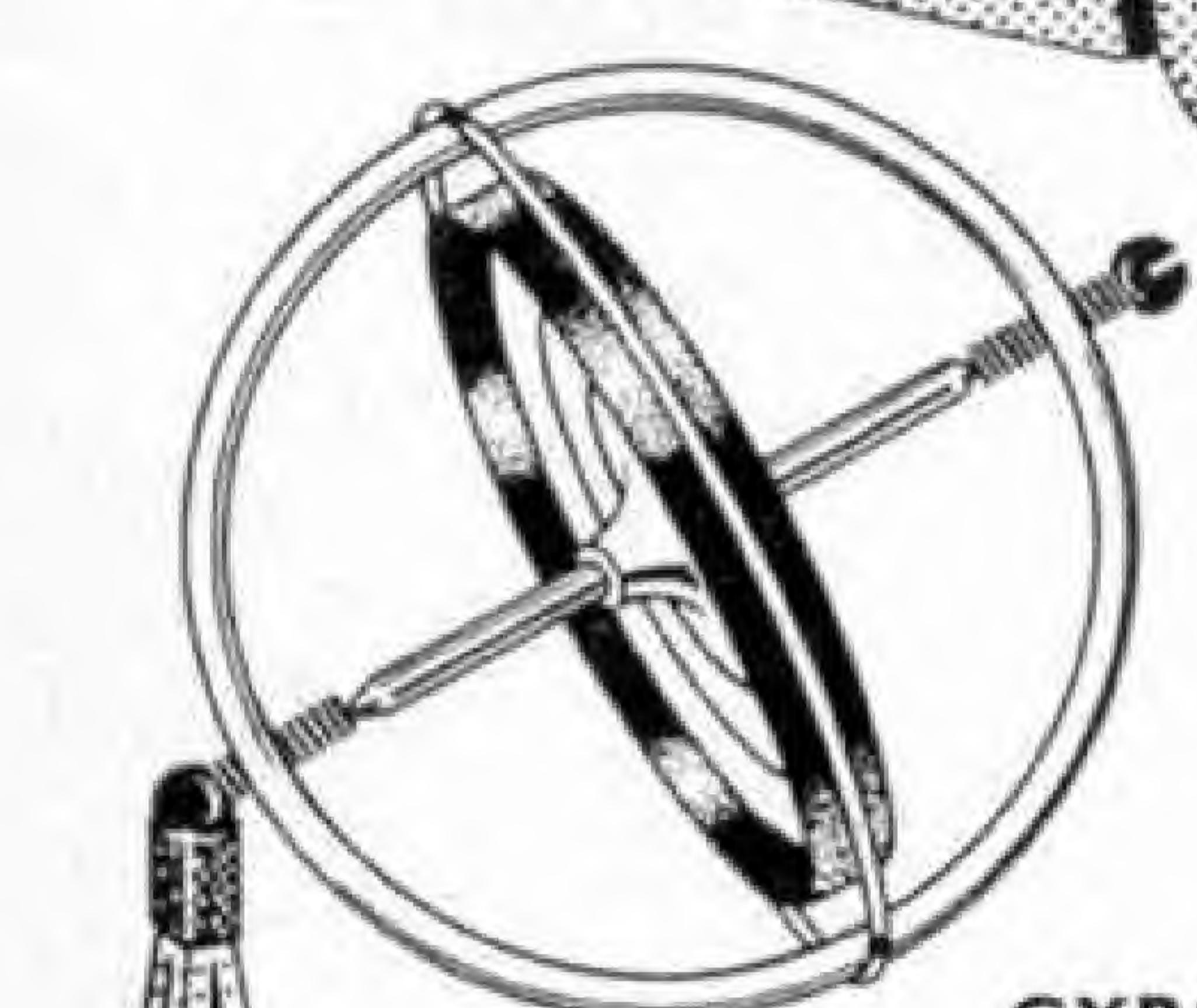
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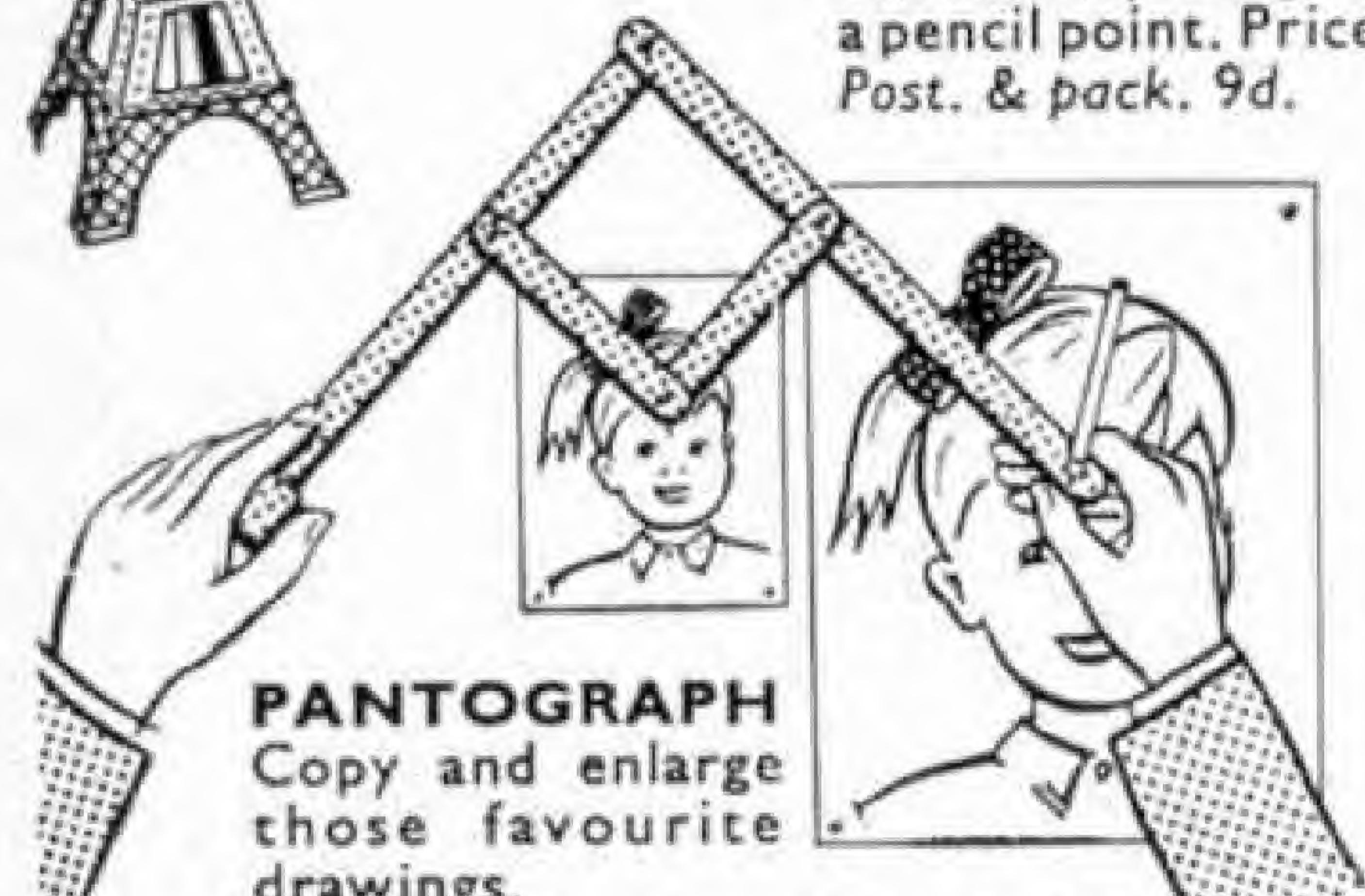
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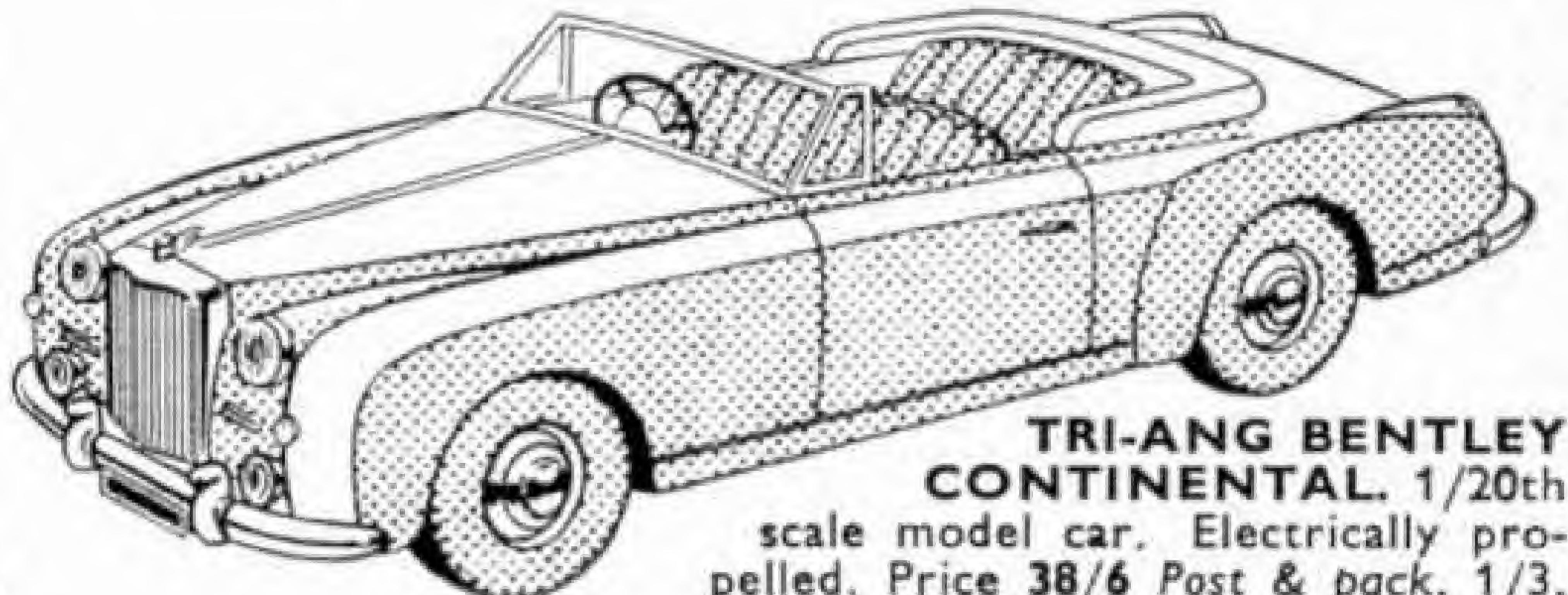


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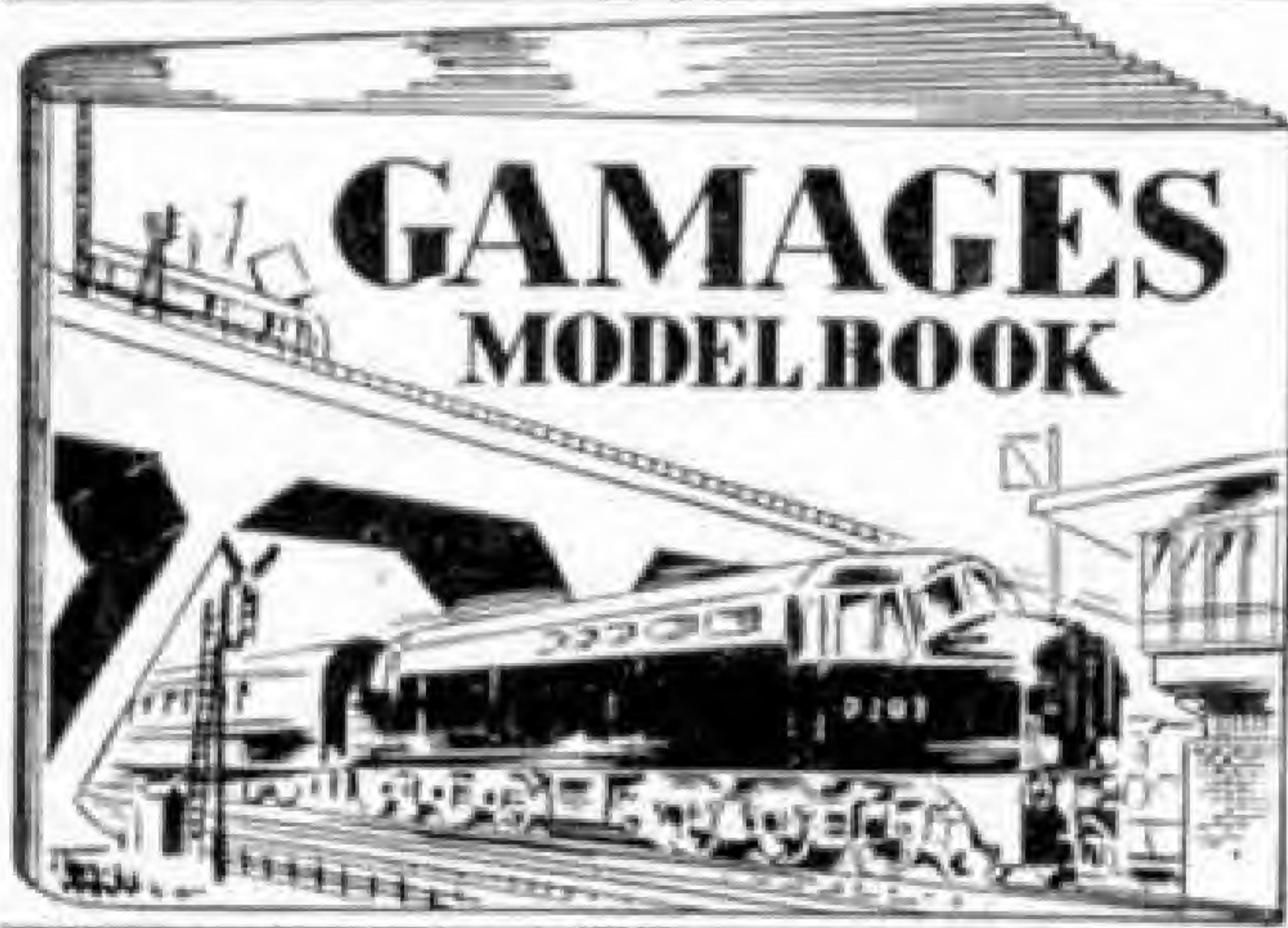
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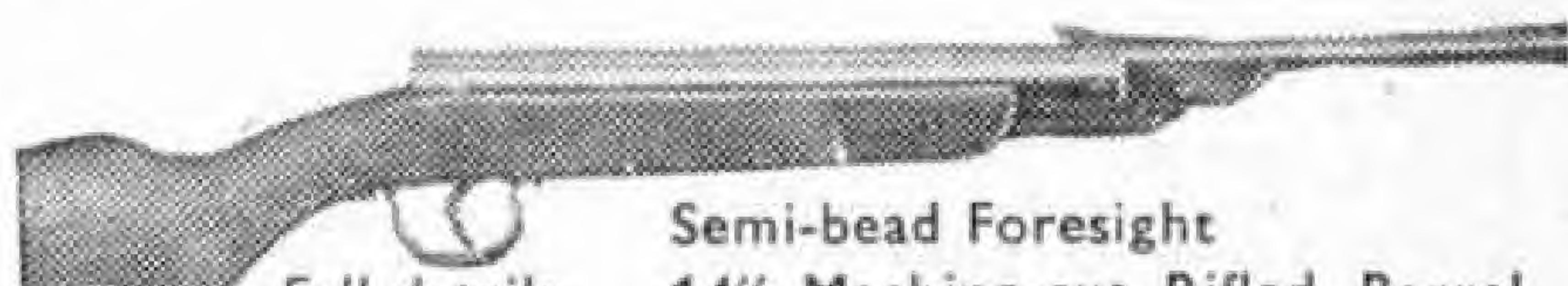
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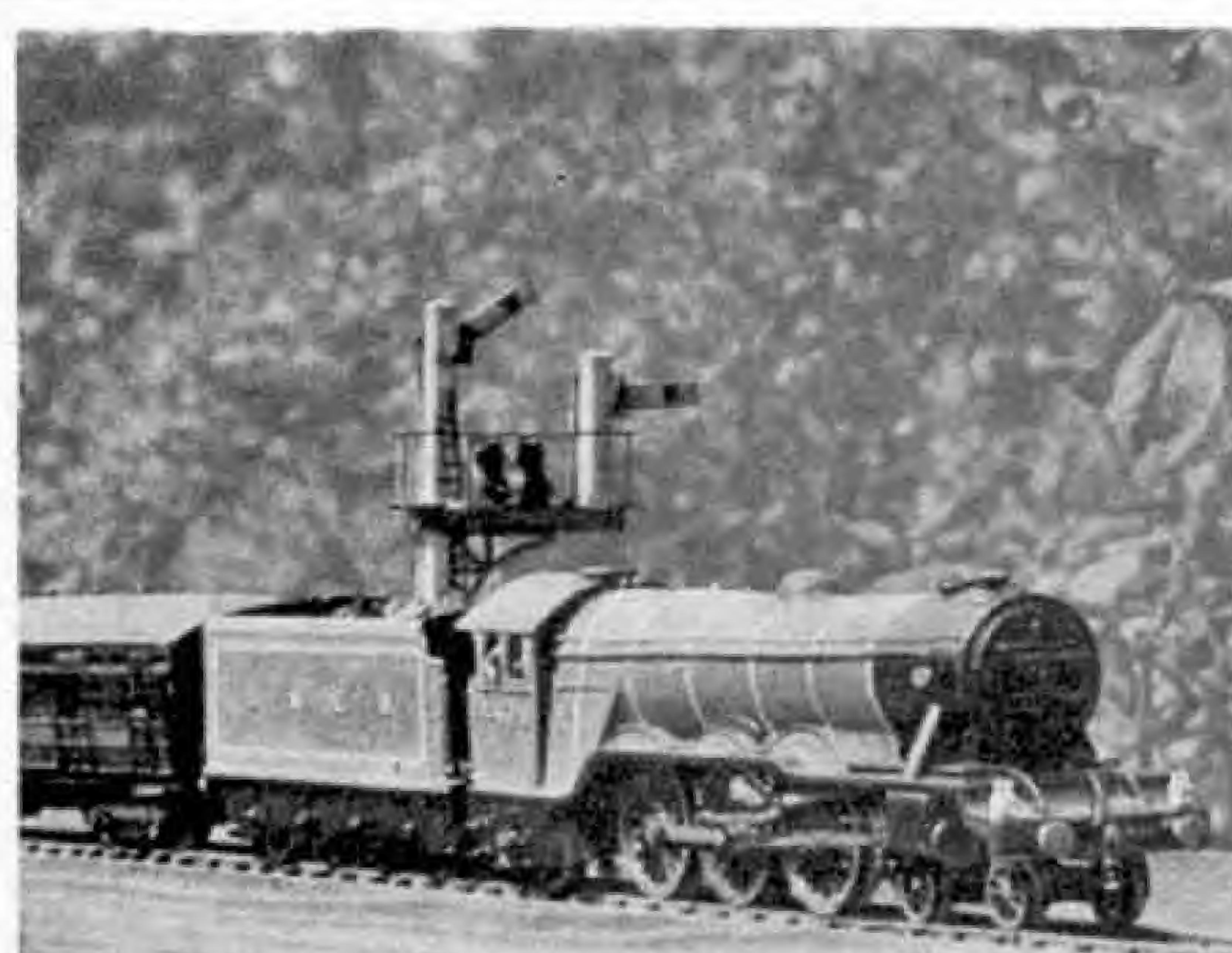
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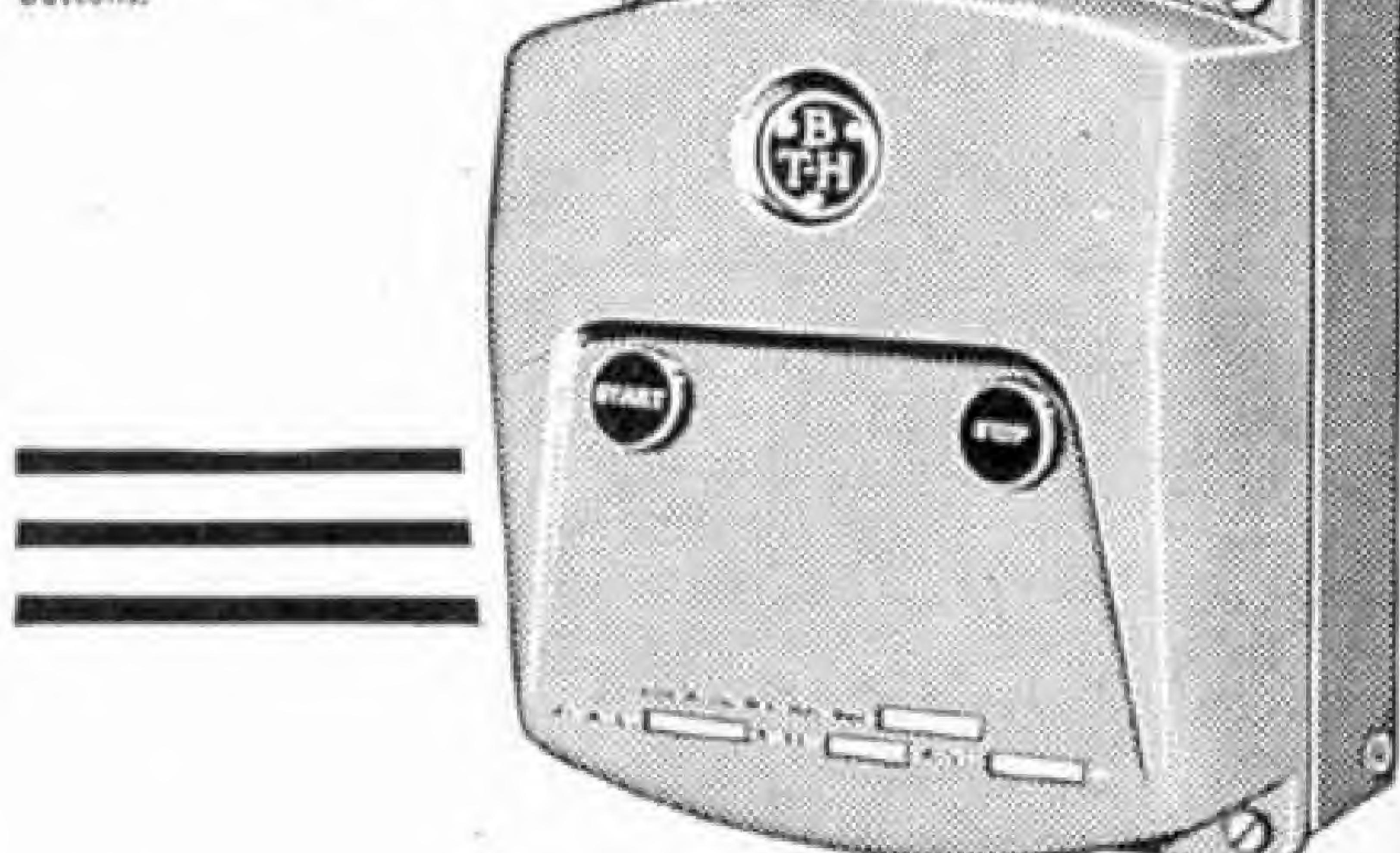
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